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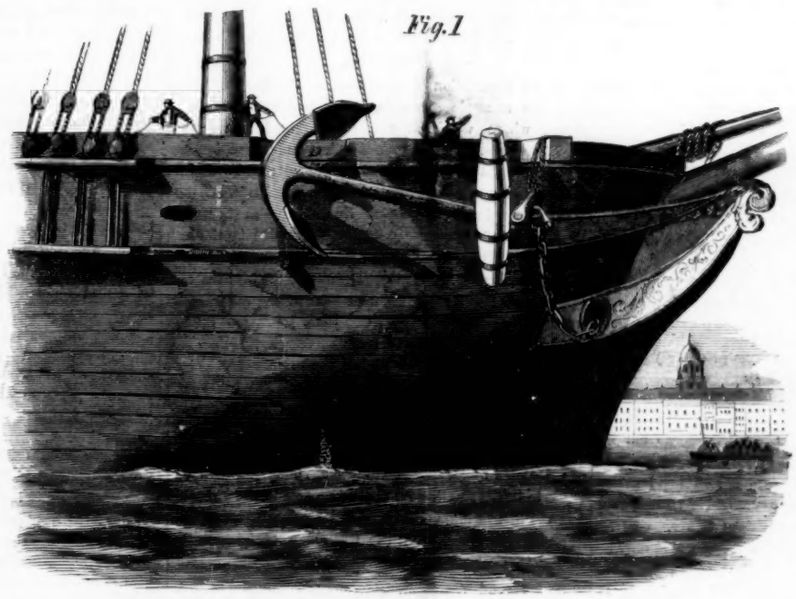
## HIGGINGS' PATENT ANCHOR TRIPPER.

There are some occasions in the course of human affairs when a few minutes of time are of immeasurable value; one of these is when a ship, freighted with valuable merchandise and more valuable lives, is drifting upon a lee shore, and it is decided to let go the anchor.

The anchor of a vessel usually hangs at the side of her bow in the position shown in the engraving, Fig. 1, with one of the flukes caught over the edge of the bulwark while the opposite end is suspended by a small chain. To get the fluke of a heavy anchor from off its hold upon the bulwark, so that the anchor will swing wholly from the cat-head, ready to be let go, a spar has to be secured to the deck, a heavy fall rigged to one of the yards above, and sundry other preparations made, which require much time. The importance of saving this time, on the occasion when it may be so very valuable, has led to the invention which we here illustrate, which enables the fluke to be released in an instant, and yet holds it during the voyage in perfect security.

*Fig. 1*



HIGGINS' PATENT ANCHOR TRIPPER.

A triangular block of iron, D, is let into the edge of the bulwark and hung upon axles, *e e*, Fig. 2, at the ends, so that it may revolve. Two latches, *f f*, fit into notches cut in the ends of the block, D, for the purpose, and prevent it from rolling. When it is desired to drop the fluke these latches are raised and the block allowed to turn. Fig. 2 is a flat view as seen from above, showing the top edge of the bulwark. In case the strain upon the latches, *f f*, causes too much friction to allow of their being raised with facility, the end of a lever, *g*, is introduced into a hole in the block, D, made for the purpose, by which the block may be so far turned as to relieve the latches from this pressure.

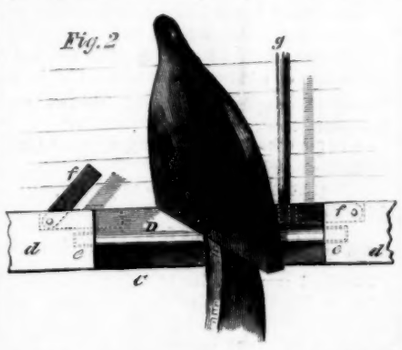
The patent for this exceedingly simple, but apparently most valuable invention, was issued Jan. 10, 1860, and persons desiring further information in relation to it will please address the inventor, Hatsel Higgins, at Orleans, Mass. A beautiful model ship with this invention attached may be be seen at Basset, Bacon & Co.'s, 36 South-street, this city.

## THE DAGUERREOTYPE.

Two metals, silver and mercury, and one other substance, iodine, were used by Daguerre in his original process. The action of light upon the iodide of silver is of a very peculiar character; it does not decompose the substance into its two elements (silver and iodine), but, in some mysterious way, it loosens their hold upon each other, so that when mercury is brought in contact with the compound, a separation of the iodine and silver takes place, and the silver forms an amalgam with the mercury. These few facts constitute the whole philosophy of the daguerreotype.

But the action of the light is so delicate that, in order to produce a picture with all the varieties of shade, the manipulation has to be conducted with a care and nicety almost inconceivable. First, a film of the iodide of silver is formed on the surface of a plate of pure silver—not by bringing solid iodine in contact with the silver, but by holding the silver plate in the vapor or fumes of iodine; and after this has been acted upon by the light, the mercury is also applied to it in the form of a vapor. The extreme delicacy of the whole operation may be partly realized when we learn that the cleaning of the silver plate, with a sufficient degree of perfection, is one of the most difficult parts of the process; it being almost impossible to prevent the impalpable dust, which is always floating in the atmosphere, from collecting upon it in sufficient quantity to injure the picture. The

*Fig. 2*




iodine, too, must never be touched by the hands, as in handling the silver plate afterwards, a stain would be produced. Many amateurs have failed in their experiments, simply from carelessness in allowing the fumes of iodine to escape into the room in which they were conducting their operations.

Daguerre's original process was briefly this: A copper sheet is plated with pure silver, the surface of which is made perfectly plane, and then polished and cleaned with the utmost care possible. The plate is then placed in a box over a little iodine which is evaporated at the temperature of the room. In from five minutes to half an hour the plate becomes of a golden yellow color, when the plate is removed from the box and placed in the camera; care being taken not to expose it to the light in the removal. In the camera it is exposed to the action of the light from the object to be represented, which produces the curious effect mentioned. On removal from the camera, no picture is seen; but on the plate being placed in another box containing a little mercury, and the mercury being evaporated by a spirit lamp, the picture comes out; the mercury being very white, and forming the most complete coating where the effect of the light has been the greatest, the shades are produced in admirable perfection. The operation is now completed by washing the iodine from the plate.

In the original process of Daguerre, the exposure required in the camera to the light was from three to thirty minutes, and was, of course, unsuited to taking portraits from life. But improvements were soon made by which this process was shortened. The first step in this series of improvements was made by Dr. Draper, of this city, who, by a change in the management of the light, reduced the time to about from 20 to 90 seconds. He was the first who rendered practical the taking of portraits from living persons by the daguerreotype process.

REFLECTOR FOR PHOTOGRAPHERS.—A new kind of reflector is described in some of the Paris papers. It resembles the well-known silvered mirrors, but differs from them in an important point. The silvered reflectors, when exposed to the atmosphere, are, sooner or later, acted upon and corroded by several gases, such as sulphureted hydrogen, chlorine, &c. It appears that at sea or in lighthouses, it is impossible to maintain their proper degree of polish. The inventor of the new kind of mirrors, in connection with the president of the "Société de la Presse Scientifique," has substituted platinum for silver in the construction of these reflectors; platinum not being affected by the above-named gases. The metallic platinum is, to this effect, precipitated from its chloride by means of essence of lavender, and fixed by a varnish consisting of a dissolution of borax. It appears that these reflectors can be offered for sale at the same rate as the silver ones. The inventor does not say whether they are as brilliant as the latter.

AN ABLE CORRESPONDENT.—The Paris correspondent of the *Photographic News* (of London) exhibits a remarkable sagacity in picking-up the most interesting discoveries in every department of science. We avail ourselves of the offer of Mr. Cassell, the publisher, and shall transfer many of his items to our columns.

## THE OBSTRUCTION TO THE NAVIGATION OF RIVERS CAUSED BY THE PIERS OF BRIDGES.

BY J. W. SPRAGUE.

In my last article, I alluded to the hight of the *remou* or back-water, but postponed the discussion of it. The present article I devote to that subject. Generally, the question of *remou* presents itself under this form:—If a certain obstruction is placed in a certain water-way, what amount of *remou* will be produced, when the water is at a definite stage, having a definite velocity in the uncontracted water-way? I know of no way of answering this question, except by the use of a long and quite complicated formula, one which it would be extremely difficult to adapt to any case other than the precise one for which it is calculated. Therefore, I prefer to change the question, putting it in such a form, as to admit of an easy answer, and one which is applicable to all cases:—What value of $b$, the hight of the *remou*, is required to change the velocity ($v$) in the uncontracted water-way above the piers into the velocity ($V$) in the contracted water-way between the piers? More simply, what hight of *remou* is required to increase the velocity, $v$, to the velocity, $V$?

Let $h$ represent the head of water necessary to produce the velocity, $v$, per second; $H$ represent the head of water necessary to produce the velocity, $V$, per second; and $g$ (=32.22 feet) represent the acceleration of velocity produced by gravity in one second. Any elementary treatise on mechanics will give, as the theoretical values of the velocities, under such a case—

$$v^2 = 2gh \quad : \quad V^2 = 2gH$$

$$\text{or} \quad h = \frac{v^2}{2g} \quad : \quad H = \frac{V^2}{2g}$$

The hight of *remou*, $b$, is only the additional head required to increase the velocity $v$ into $V$. Hence $b$ is the difference between the heads, corresponding to the velocities $v$ and $V$, or—

$$b = H - h$$

Substituting in this the values of $h$ and $H$, as given above, we have—

$$b = \frac{V^2}{2g} - \frac{v^2}{2g} = \frac{1}{2g}(V^2 - v^2)$$

According to theory, then, the hight of *remou* would be the difference between the squares of the velocities divided by 64.44; but theory is not fully borne out by practice. The value $v^2 = 2gh$ or $V = \sqrt{2gh}$ is found to be too large by several per cent. The head corresponding to the velocity of any navigable river would not exceed three feet. For different heads, varying from three feet down, the actual velocity would only be about 96 per cent of the theoretical velocity; hence we should have $v = 0.96\sqrt{2gh}$: $V = 0.96\sqrt{2gH}$, or $v^2 = 1.84gh$: $V^2 = 1.84gH$; hence $h = v^2 \div 1.84g$: $H = V^2 \div 1.84g$; substituting these corrected values of $h$ and $H$, in the value of $b$, already given, we have—

$$b = H - h = \frac{V^2}{1.84g} - \frac{v^2}{1.84g} = \frac{1}{1.84g}(V^2 - v^2)$$

reducing $b = .017\,(V^2 - v^2)$

This gives the rule for determining the hight of *remou*: *From the square of the velocity in the contracted water-way between the piers, deduct the square of the velocity in the uncontracted water-way above the piers; seventeen one-thousandths* (.017) *of the remainder will give the hight of the remou in feet.* The velocities used must be in *feet per second.* As an example under this rule:—What hight of *remou* is requisite to change a velocity of six miles per hour into one of seven miles per hour? Six miles per hour is 8.7 feet per second. Seven miles per hour is 10.3 feet per second. Using these values under the rule:—

$$b = .017\,(10.3^2 - 8.7^2) = 0.52.$$

Hence a hight of *remou* of about ½ a foot or 6 inches is necessary to produce the required change.

The area of the cross section of any river, at the point where any bridge is to be erected, as well as the velocity of the current, for various stages of water, are to be determined by actual measurements. The plan upon which the piers are to be built will furnish a means of determining the amount of obstruction they will offer. Hence all these elements of the calculation may be regarded as known quantities.

A comparison of this article with the preceding ones will show that we have arrived at these results:—If we know the hight of *remou*, we can determine the increase of velocity in the contracted water-way. If we know the increase of velocity in the contracted water-way, we can ascertain the hight of *remou*. Here are two data, either of which being known, enables us to determine the other; but at the outset, we do not know either, and have no independent means of determining either. What then is to be done? Assume a value for the hight of *remou*, and upon that assumption determine the increase of velocity in the contracted water-way. Having now values for $v$ and $V$, determine the corresponding hight of *remou*. This calculated value of hight of *remou* will not probably agree with the assumed one; but comparing the two together, it will be very easy to determine a new assumed value of height of *remou* more correct than the first assumed value. Using this newly assumed value just as the first assumed value was used, a third assumed value can be obtained more nearly correct than either of the other two. A few trials of this sort will give results sufficiently correct for all practical purposes, and having this advantage, that the limits of error can be readily determined, and that every additional trial brings us nearer to the truth. I am familiar with the formulæ given in the books for determining these results, but have no hesitation in saying that, for *any* and *every* case, I prefer the method I have pointed out to that given in the books. There are many cases (as, for instance, the one alluded to in the first article of this series) when the method of the books is totally inapplicable, but to which the method I have indicated may be easily adjusted.

As an illustration of this process of approximation, take the example given in the second article of this series, where we have the uncontracted water-way = 10,000 square feet; the obstruction caused by the piers up to the water-line 1,000 square feet; and the sum of the distances between the piers 900 lineal feet. Take the velocity in the uncontracted water-way at six miles per hour, or 8.7 feet per second. What will be the increased velocity of the current between the piers and what the hight of *remou*? Assume, at random, the hight of *remou* to be 0.3 of a foot. Then we have for the contracted water-way $0.99\,[10{,}000 - (1{,}000 + 900 \times 0.3)] = 8.643$ square feet, and for the increase of velocity, $10{,}000 \div 8.643 - 1 = 16$ per cent, giving the increased velocity $8.7 \times 1.16 = 10.1$ feet per second. What hight of *remou* is required to change a velocity of 8.7 to one of 10.1? $b = 0.017\,(10.1^2 - 8.7^2) = 0.45$. A comparison of the assumed value of $b$ (0.3) with its value (0.45), as calculated under that assumption, shows the assumed value to be too small. As every increase in the value of $b$ in the first formula will increase its value in the second formula, it is evident that the *true* value of $b$ is greater than 0.45.

As a second assumption, take the value of $b = 0.6$. Then we have for the contracted water-way—

$$0.99\,[10{,}000 - (1{,}000 + 900 \times 0.6)] = 8.375$$

and for the increase of velocity,

$$(10{,}000 \div 8.375) - 1 = 19 \text{ per cent},$$

giving the increased velocity, $8.7 \times 1.19 = 10.4$ feet per second, giving $b = 0.017\,(10.4^2 - 8.7^2) = 0.55$.

Comparing the second assumed value of $b$ (0.6), with its value (0.55), as calculated under that assumption, shows this second assumed value to be too great. Since 0.43 is too small a value for $b$, and 0.6 is too great a value for it, the true value of $b$ lies between these two, and the true increase of velocity is between 16 and 19 per cent.

As a third assumption, take $b = 0.5$. Then we have for the contracted water-way—

$$0.99\,[10{,}000 - (1{,}000 + 900 \times 0.5)] = 8.465$$

and for the increase of velocity,

$$(10.000 \div 8.465) - 1 = 18 \text{ per cent},$$

giving the increased velocity,

$$8.7 \times 1.18 = 10.3 \text{ feet per second},$$

giving $b = 0.017\,(10.3^2 - 8.7^2) = 0.5$

The third assumed value of $b$ (0.5) agrees with its value, as determined under that assumption. Hence this third assumption is correct, and we have the actual increase of velocity 18 per cent, and the hight of *remou* half a foot or six inches.

Generally a sufficiently correct value can be arrived at by two or three assumptions, but sometimes more will be necessary. In the illustration just given, after the second assumption, we had assigned *limits within which the true values must be.*

The measure of the amount of resistance, encountered by a steamboat in attempting the ascent of a draw, will be discussed next week.

## GLYCERINE FOR GAS METERS

On page 149 of the present volume of the SCIENTIFIC AMERICAN, we published an extract from the annual report of J. C. Cressen, Esq., of the Philadelphia Gas Works, in which it was stated that he had been experimenting with glycerine (and with a very encouraging prospect) as the best fluid for gas meters, to prevent freezing in winter. Since that extract was published, our attention has been directed to an article read before the American Association for the Advancement of Science, at Baltimore, Md., in 1858, by Henry Wurtz, Esq., formerly professor of Chemistry in the National Medical College, Washington, and now of the Patent Office, in which he recommends the use of this fluid for such a purpose, and this appears to be the first published suggestion for such an application. We quote the following from his interesting paper on glycerine:—

"The common water meters, used for measuring the consumption of illuminating gas in houses, are open to two strong objections, namely: when in a warm situation the water rapidly evaporates, and when in a cold place it freezes. To avoid congelation, the usual expedient is to fill the meter in cold weather with alcohol or whiskey, thus rendering the first mentioned difficulty, that of evaporation, still more inevitable. Now what liquid do we possess which is practically free from these objections of evaporation and congelation? Evidently diluted glycerine. I propose, therefore, as a substitute for both water and alcohol for filling gas meters, *glycerine* (sufficiently diluted to prevent its absorption of more water from the gas, and increasing in volume to any important extent), thus rendering the meter independent of attention within the ordinary limits of temperature.

"For lubricating the bearings of fine machinery also, and particularly of chronometers, glycerine seems to me worthy of a trial, as it as unchangeable by the atmosphere, and remains fluid at temperatures which few or none of the oils will resist. For chronometers, pure oleine and oleic acid have been used, but the former thickens on exposure to the air, and the latter congeals at a few degrees below the freezing point of water. Other uses occur to me, such as in the preparation of copying ink, in water color painting, and in the preservation of dried plants for *herbaria* in a flexible state, mere allusions to which may at present be sufficient."

## LOSS OF LIGHT BY GLASS SHADES.

A correspondent (W. King) of the London *Journal of Gas-lighting* gives the following table, made up from a series of experiments, of the amount of light lost by various shades:—

| Description of shade. | Loss of light. |
|---|---|
| Clear glass | 10.57 per cent. |
| Ground glass (entire surface ground) | 29.48 " |
| Smooth opal | 52.83 " |
| Ground opal | 55.85 " |
| Ground opal, ornamented with painted figures, the figures intervening between the burner and the photometer screen. | 73.98 " |

As the large amount of light lost by the use of a clear glass shade excited some surprise, a sheet of common window glass was placed between the burner and the photometer screen, when it was found that 9.34 per cent of the light was intercepted, thus confirming the result obtained by the employment of a shade of clear glass. The shades were selected from a large number, and great pains taken to obtain an average specimen of each kind.

This is an interesting subject and opens a new field of inquiry to gas-makers and consumers. These investigations may throw some light upon the apparent difference of the illuminating power in gases and oils, on different occasions; the fault may be in the glass shades, not in the light itself.

POLITICAL ENGINEERS.—The Washington correspondent of the *New York Express* tells the following story which suggests a possible explanation of some boiler explosions:—A most laughable affair took place this morning. Mr. Forney has appointed a certain office-seeker to be assistant engineer at the Capitol. Several members were in the engine room, admiring the machinery, and one asked what was the *horse-power* of the engines? "Horse-power!" exclaimed the man with a round oath; "it ain't *horse-power*. IT GOES BY STEAM!" The members said nothing, except that he was honest; and, as there was some danger of his removal for his well-known democratic principles, they wrote to Mr. Forney and requested him to retain so efficient an engineer.

## HOW TO MAKE A MUSHROOM BED.

Previous to making beds (for they may be made at any season of the year), collect a quantity of fresh horse manure that has not been exposed to wet or fermentation; clear it of long straw, so as to leave all the short that has been trodden into the wet interstices of the stable floor, partially dry it, either in a shed, or under a tree; turn it over once or twice till it is half dry; to this add one-fourth of light turf, cut fresh from a pasture field, chopped small with a spade but not sifted; a few decaying oak or beach leaves, and a small portion of sheep manure, mix the whole well together and throw them in a heap till they begin to sweat, then take and spread a layer of the mixture four inches thick on the place where they are intended to be grown, and beat it down firmly with a mallet, and continue this until the bed is not less than a foot thick; should it heat so that there is danger of rotting, make a few holes in the bed with a dibble; of this, however, there is little fear, if the manure and soil have been properly dried. After the heat begins to subside the spawn is to be put in, making holes about nine inches apart, and putting pieces of the spawn about three or four inches square in them, leaving the holes open at the top to allow the steam, if any, to escape; about a fortnight after the spawn has been put in, the holes should be again spawned, in case the first should have received any injury, and also to prolong the bearing of the bed; close them firmly up as soon as the spawn has run through the bed, which can easily be known by examination; the bed is to be covered over with dry soil from a pasture field or common, and firmly pressed, but not beaten, as that would break the threads of spawn, which are fast approaching the state of mushrooms.

Mushrooms are impatient of wet; therefore, wherever they are grown, it is indispensable that they should have a dry bottom; when the beds are in want of water, the best plan is to give them a moderate watering at once, in preference to many light waterings; the water should be warm, and though the crop should be destroyed, they will spring up in a few days with renewed vigor. Mushrooms may be grown in any place that is dry—in a shed, or a stable, in a box, or a drawer; and in either case the process is the same. Covering the beds is injurious, and should not be adopted except in severe weather, or in old beds where the heat is decayed.

Mushrooms are impatient of the extremes either of heat or cold; the proper temperature is from 55° to 60°, and where this cannot be steadily maintained by some means or other, the cultivation of them in the winter season should not be attempted.

The beds made in the manner herein described will be firm, yet elastic, and if the manure has been properly dried there will be little fear of its overheating: at the same time its decomposition will be prevented, and that mild heat so congenial to the mushroom will be prolonged. The plentiful use of earth, moreover, will tend to give it that firmness of flesh and fineness of flavor which we seek for in vain in mushrooms grown in the dark.

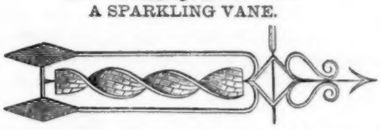
The principal requisites for the successful culture of the mushroom may be thus defined:—never allow the manure to get wet or to ferment, keep a regular heat, and avoid all damp; these, with a moderate share of attention, will ensure a moderate crop of good mushrooms.—*Florist.*

## A WONDERFUL CAVE.

Messrs. Editors:—Near the village of Decorah, in Winneshiek county, Iowa, there is a cave which is a great curiosity. It is situated directly opposite the above-named town, on the north side of the upper Iowa river; the entrance to it being about 150 feet above the river. The great peculiarity of this cave is its natural ice-house. The ice commences to form as the weather grows warm from early spring, and continues until the close of summer, advancing in thickness as the heat of the season increases. As the cold comes on in the Fall, the ice begins to decrease; and the colder the weather, the faster does the ice go away. This is the general report of all those who have visited the cave for years back, both in summer and winter. I intend to visit this cave as often as once in two weeks, and report the facts as I find them from time to time. To-day (Feb. 28, 1860) I have made my first *winter* visit, and the following is a correct account of my trip:—A friend and I started at 11 o'clock A. M., and the distance being short, we soon arrived at the foot of the bluff and commenced our ascent. After falling down, scratching our hands on the prickly ash, bruising our shins on the small pieces of rock, pulling ourselves along and up by the little brush, we arrived at the mouth of the cave (which is wide enough for two or three to enter abreast). We then commenced our descent at an angle of about 45°; but we soon had to "single out," as the space grew narrow. Going down this way for about 20 feet, we come to a level spot where a fire had recently been made by some previous explorer, as indicated by the ashes, &c. At this place the main part of the cave leads to the right: at the left there is an opening as large as the main trunk, but it only extends a short distance, runs very high, and has a hole out at the top about as large as a nail keg, some 50 feet up the bluff, which, I suppose answered for a chimney to those who had built the fire. Leaving this place, we went on, sometimes erect, then stooping and crawling, as occasion required, until we came to the end; this being about 200 feet (as near as I could judge) from where we entered; finding no ice or water, the walls were perfectly dry all the way. Now, for the first time, we examined our thermometer, which stood at 36° above zero. After halting until we satisfied ourselves that the thermometer did not vary from the above, we started on our return, stopping at intervals to see if the temperature varied. When we came near the mouth of the cave, the thermometer fell to 34°, then 32°; and, on arriving out in the open air, it settled to only 28° above zero, where it remained. At *this* season of the year, I certainly expected to find ice; as I have seen it 10 inches thick on the walls of this cave in the month of July. J. W. H.

Decorah, Iowa, Feb. 28, 1860.

## A SPARKLING VANE.



A very curious and elegant vane for spires may be made, by placing in the center, a spiral or twisted spindle, as shown in the above cut. This spindle should be hung on delicate pivots, and the spaces between the spiral flanches nearly covered with small pieces of looking-glass or thin plates of mica. The least breeze will put it in motion, and as the reflectors will assume every possible position, several of them will be sure to present the reflection of the sun at every revolution, from whatever point it may be viewed, thus producing a constant and very brilliant sparkling.

## PHILOSOPHICAL INSTRUMENTS.

At a late meeting of the London Association of Foreman Engineers, Mr. Bickley gave an explanation of several scientific instruments used at the famous Kew Observatory. The *anemometer* employed in measuring the velocity and force of the wind consists of an upright hollow column which supports four arms, each terminating in a hemispherical cup. The arms are united at the center by a socket, and this moves freely over the neck of the column. The wind impinges upon the insides of the cups, and naturally a rotatory motion is given to the arms of the anemometer. A rod connected with the arms, and passing through the column, gives motion to the self-registering machinery below. Every caution to avoid friction is taken. Hence the force and direction of the currents of air passing over the observatory are accurately recorded. The anemometer at Kew is never at rest, there is no such thing as a calm in that locality; and, on one occasion lately, the wind swept over at the rate of 960 miles in 24 hours, or 40 miles an hour. Barometers, thermometers and other instruments are tested at Kew, and sent forth with a warrant of accuracy stamped upon them (when found correct) in the form of the initials "K. O." A very well-made model of an ingenious machine, in use at Kew for measuring the magnetic forces, horizontal and vertical, was explained to the above meeting, and much curious information respecting the extraordinary variations of the magnetic needle was given. This machine registers any fluctuation of the magnetic forces, and some photographic copies of magnetic registers gave evidence of the eccentric nature of those fluctuations. The aurora borealis is one of the greatest disturbers of the magnet.

## THE WATER WHEEL EXPERIMENTS AT PHILADELPHIA.

Messrs. Editors:—On page 168 of the present volume of the Scientific American, in your comments on turbine water wheels, you say: "And if we are correctly informed in regard to the results of experiments at the Philadelphia Water-works, there would seem to be yet wide room for improvement in this department; the best turbines yielding only some 60 per cent of power expended, instead of 80 to 90, as has been heretofore claimed." Your information on this subject is not well founded. The results of our experiments vary from 54 to 87 77-100 per cent, the last being the highest result yet obtained. The center vent wheels all being the lowest in per-centage, they varying from 54 to 61 per cent. The Parker wheel (75 63-100) and the Jonval turbine being the highest, three of them—made by different makers—have produced 76, 82 and 87 77-100 per cent respectively. The Tyler wheel produced 71 per cent, and the Blake wheel nearly 72 per cent. Our experiments have been conducted on the most accurate principles possible, and have been very interesting to the chief engineer and the committee. And I am pleased to say that the wheel-men who have participated in the tests are unanimous in their praise of the tests, and the impartial manner which they are conducted (with but one exception, only, I believe), and if we were disposed to continue the experiments, our apparatus would be occupied for a year longer; but we will be compelled to close the experiments as soon as a few more wheels are tested that are now here waiting. As soon as the tests are closed, the chief engineer will furnish you with the results in tabular form, with a description of each wheel, &c., which will be more full and complete than has ever been published in this or any other country.

O. H. P. Parker,
Chairman of Committee

Philadelphia, Pa., March 17, 1860.

## FAWKES' STEAM PLOW.

Mr. Fawkes, the inventor of the steam plow, has just received the large gold medal awarded to him by the United States Agricultural Society, through the President of the United States, accompanied with the following appropriate letter:—

Washington, Jan. 25, 1860.

My Dear Sir: I have been requested by the "United States Agricultural Society" to present you the "Grand Gold Medal" awarded to you by the society, at Chicago, in September last. A more agreeable duty could not have been confided to me. The pleasure is enhanced by the consideration that we are both citizens of the good old county of Lancaster. You may feel justly proud of your invention. Whilst those who have made improvements on deadly weapons for the destruction of the human race are receiving honors and rewards from governments, your's has been the far more important and useful task of improving the plow for the benefit of agriculture, and your recompense will consist in the approbation of your countrymen, and the consciousness that you have conferred an important benefit upon mankind.

Your's, very respectfully,
James Buchanan.

J. W. Fawkes, Esq.

The medal is of pure gold, 3 inches in diameter, and nearly a quarter of an inch thick. Its value is estimated at $300.

One of Mr. Fawkes' plows is now being constructed by Miles Greenwood, of Cincinnati, in which several improvements will be introduced, making the machine much lighter without diminishing its power.

Restoring Damaged Velvet.—The *Monitor de la Salud* publishes the following method of restoring velvet to its original condition. It is well-known that when velvet has been wet, not only its appearance is spoiled, but it becomes hard and knotty. To restore its original softness, it must be thoroughly damped on the wrong side, and then held over a very hot iron, care being taken not to let it touch the latter. In a short time the velvet becomes, as it were, new again. The theory of this is very simple. The heat of the iron evaporates the water through the tissue, and forces the vapor out at the upper side; this vapor passing between the different fibers, separates those which adhered together in hard bunches. If the velvet were ironed after damping, an exactly opposite result would be obtained; it is, therefore, necessary that the substance should not come in contact with the heated iron.

## A CHANCE FOR INVENTORS—A GREATER THAN WHITNEY WANTED.

MESSRS. EDITORS:—Through the medium of your truly valuable sheet, I wish to call the attention of the inventive genius of some of your friends to an invention (yet to be made) that, if successful, will be to the inventor an everlasting fortune and an eternal income: I refer to the cotton gin. The plan now adopted for separating the seed of the cotton from the lint (and which has been in use from the first raising of cotton in the country to the present time) is, as you are well aware, the saw gin, and it does saw the cotton in every sense of the word. It cuts the staple, knocks it, tears it, and, in fact, in a great measure destroys it; and an improved cotton gin that would do away with these objections would enhance the value of cotton one-fourth at least. Here is a pretty margin, and some one must embrace it. Let the prime, main object of the inventor be to preserve the staple of the cotton entire. The staple of the cotton is what sells it; cotton may be unexceptionable in color, free of dust, leaves and all kinds of trash, and yet, with the staple destroyed, in a measure, by the process of ginning, the price obtained will be merely nominal.

I have made these suggestions with the hope that some scientific genius will give the subject a thorough investigation, and as I before remarked, whoever invents a cotton gin that will accomplish the ends required will be remunerated to an extent unheard of in the line of patents. I shall be happy to give information to any one as to any question that may arise concerning cotton in any or all its stages, or relating to the process now in use for ginning. There has been as little improvement made in cotton gins as ships' anchors. Who will reap the harvest?

A. J. H.

Camden, Arkansas, March 14, 1860.

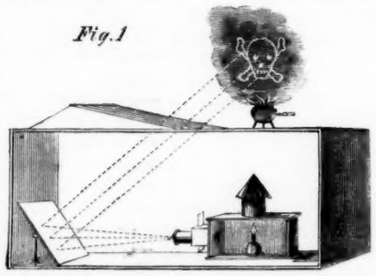
[This has been a favorite field for inventors, and it is very remarkable that a merely mechanical obstacle to the accomplishment of so very great a desideratum should have so completely baffled the inventive genius of the country. In the winter of 1792, as Mrs. Greene, widow of the famous revolutionary general, was one day entertaining at Mulberry Grove (her place near Savannah) some gentlemen of the neighborhood, the conversation turned on the subject of the cultivation of cotton, which had been recently introduced to a small extent in the country. As it required the labor of an entire day to separate the seed from a single pound, it was manifest that unless some mode could be devised for doing the work more rapidly, the production of the article could never be carried to any great extent, and a strong desire was expressed by the company that some machine could be invented for ginning the short staple or green seed cotton. Mrs. Greene told the gentlemen that they had better apply to her young friend, Mr. Whitney; she presumed he could do it, for he could do almost anything. Mr. Whitney was at this time studying law, having recently graduated at Yale College; and he was spending a short time with Mrs. Greene at her hospitable invitation, having made her acquaintance on their voyage from the North. On learning what was wanted he addressed himself to the task; and not being able to procure cotton with the seed in it in the neighborhood, he visited Savannah for that purpose, and after a search through the warehouses of the city, he succeeded in finding a small quantity. Taking it home he soon devised that famous machine which has wrought such changes in the condition of this country and of the world. Whitney's machine cleaned 300 lbs. in a day, and did it better than one pound could be done by hand in the same time. In the saw gin the cotton is seized by rows of teeth formed of strong wires projecting from a roller, or by teeth like those of a saw made upon circular plates of iron. These pass between grate-bars set so closely together that the seed cannot pass through, but the cotton is drawn in and swept off by a cylindrical brush. Notwithstanding the immense improvement which was embraced in this machine over the old process of cleaning by hand, we are informed (by the above correspondent) that it is still very imperfect, and that it destroys the enormous amount of one-fourth of the value of the whole cotton crop. Here is a field for inventors! A chance to save $40,000,000 per year! The practical mode for our correspondent to forward his object is to distribute samples of cotton in the seed to inventors, and it will be very wonderful indeed if they are not able to surmount a merely mechanical obstacle to the accomplishment of so great an object.

## CURIOUS OPTICAL PHENOMENA.

MESSRS. EDITORS:—Of all our senses, the *sight* is certainly subject to the greatest illusion. We every day discover new phenomena, and doubtless many more are reserved for posterity. It frequently happens, moreover, that a discovery which at first seemed of little consequence has led to matters of the highest importance. The accompanying diagrams are demonstrations of two experiments, an account of which I have been induced to send you by recently seeing in the SCIENTIFIC AMERICAN (page 142) an answer to a correspondent, stating "No mirror can throw an image into the atmosphere." I did not doubt your statement, but I thought that my experiments seemed to contradict it. If I am wrong, please place me in the right.

*Experiment I.*—Take a wooden box (Fig. 1), and place within it a magic lantern. At the end towards

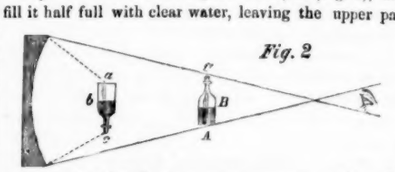
*Fig. 1*



which the lantern points, place a mirror at any suitable angle with the end, say 45°. Cut an aperture in the top, and near it place a chafing dish, in which burn some charcoal or more suitable substance that will create a dense smoke; for example, some incense. Procure a glass slide, on which a phantom or more pleasing figure is painted; and after lighting the fire in the chafing dish, throw the incense upon it, and insert the picture in the lantern, and a magnified view of the phantom or other picture will be obtained in the cloud of smoke!

*Experiment II.*—Take a glass bottle, A (Fig. 2), and fill it half full with clear water, leaving the upper part

*Fig. 2*

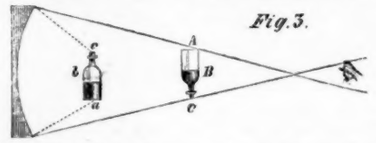



empty, and cork it in the common manner. Place this bottle opposite a concave mirror, and beyond its focus, that it may appear reversed and before the mirror. Place yourself still farther distant than the bottle, and it will appear to you in the situation, *a b c*.

Now it is remarkable, in this apparent bottle, that the water which, according to all the laws of catoptrics and all the experiments made on other objects, should appear at *a b*, appears on the contrary at *b c*, and consequently the part *a b* appears to be empty!

If the bottle be inverted and placed before the mirror

*Fig. 3.*




(Fig. 3), its image will appear in its natural erect position; and the water, which is in reality at B C, will appear to be at *a b*.

If, while the bottle is inverted, it be uncorked, and the water permitted to run gently out, it will appear that while the part B C is emptying, that of *a b*, in the image, is filling; and (what is likewise very remarkable) as soon as the bottle is empty, the illusion ceases, the image also appearing entirely empty. Likewise, if the bottle be quite full, there is no illusion.

If, while the bottle is inverted and partly empty, some drops of water fall from the bottom, A, towards B C, it seems in the image as if there were formed at the bottom of the part *a b*, bubbles of air that arise from *a* to *b*, which is the part that seems full of water. All these phenomena constantly appear. The remarkable circumstances in this experiment are, first, not only to see an object where it is not, but also where the image is not; secondly, that of two objects which are really in the same place, as the surface of the bottle and the water it contains, the one is seen at one place and the other at another; and we see the bottle in the place of its image, and the water where neither it nor its image is.

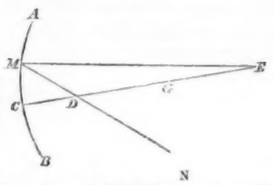
It has been conjectured, with some appearance of reason, that the above-described illusion arises partly from our eyes not being accustomed to see water suspended in a bottle with the neck downward, and partly from the resemblance there is between the color of the air and that of water, which induces us to imagine that we see them where they usually are; and this is rendered more probable by putting any colored liquid into the bottle, for that will appear in its proper place.

E. S. B.

Commack, L. I., March 21, 1860.

### REMARKS.

Our correspondent has not correctly quoted the answer to which he refers. It is as follows: "No mirror can *form* an image in the atmosphere." We considered that it was a correct answer to the question asked, and do so still. We understood it to mean the forming of an image in the atmosphere, similar to the one in Fig. 1 (which can be found in several published works), in which the image is shown by the reflection of the solid particles arising from the dense gas, which is quite a different condition. There is a looseness of expression in many works of science regarding the action of mirrors, such as "the image is behind the mirror," for "the image *appears* to be behind the mirror;" and "the image is formed in the atmosphere," instead of "*appears* to be in the atmosphere." The accompanying diagram explains the action of concave mirrors.




A B represents a mirror forming part of a sphere, whose center is at G; and C G is the radius. Let us suppose an object, E, to be very distant from the mirror, its image will appear before the mirror at D, the middle point of the radius, C G; for a ray of light, E M, from the object, E, falling on the surface at the point, M, will be reflected thence in such a manner as to pass through the point, D; and when the eye is placed at N, it will see the object apparently at D. This image will be to the object in the ratio of C D to C E, and (as a consequence) much smaller. By bringing the object from E nearer to the mirror, the image will retire; and when it is brought to the center, G, the image appears to be situated there; but you must look towards the mirror to see it—not from A or B to the atmosphere at G. If the object is now brought forward to D, the image will retire infinitely beyond E; but if the object be placed between C and D, the image will appear to fall *behind* the mirror, and will be greater than the object. A concave mirror either enlarges or contracts the size of the objects, according to the distance they are situated from it. If we look into a concave mirror at a point between C and D, the face will appear frightfully large; this is owing to the nature of reflection—the angle of incidence, E M A, being always equal to the angle of reflection, C M N. The image, A B C (in Figs. 2 and 3) is placed beyond the center.

There are many curious phenomena connected with optics; but everything relating to the reflection of rays by mirrors is reduced to two things—the one is the *place* of the image which the reflected rays represent, and the other is the *relation* of the image to the object; in other words, *where* the image is, and *how* it is. When we look into a plane mirror, we see our own image behind the glass; that is, if we are situated two, three or more feet from the mirror, our image appears to be at the same distance behind it, and it is customary thus to speak of it; but, in reality, there is only a shadow behind the opaque mirror. It would, therefore, be more correct to say "the image *appears* to be behind the mirror," and "the image *appears to be in the atmosphere before the mirror*," as in the case of concaves; and so on. A convex mirror represents objects in miniature; a concave mirror magnifies objects placed near to it, but when they are

situated at a considerable distance, they appear inverted and much smaller.

The following is an interesting extract on this subject from Sir J. Emerson Tennent's recent work on Ceylon :—"A curious phenomenon, to which the name of 'Anthelia' has been given (and which may probably have suggested to the early painters the idea of the 'glory' surrounding the heads of beatified saints) is to be seen in singular beauty at early morning in Ceylon. When the light is intense, and the shadows proportionally dark—when the sun is near the horizon, and the shadow of a person walking is thrown on the dewy grass—each particle furnishes a double reflection from its concave and convex surfaces; and, to the spectator, his own figure (but more particularly the head) appears surrounded by a 'halo' as vivid as if radiated from diamonds. The Buddhists may have taken, from this beautiful object, their idea of the *agni* (an emblem of the sun) with which the head of Buddha is surmounted. But, unable to express a halo in sculpture, they concentrated it into a flame."

## A NEW AREOMETER FOR DETERMINING THE REAL DENSITY OF LIQUIDS.

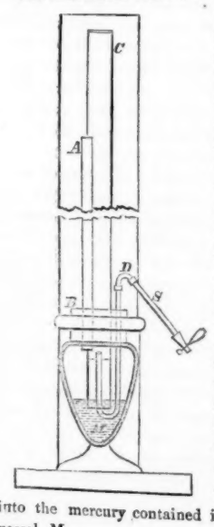
If two liquids of different density are in equilibrium in communicating vessels, the heights of the two columns are inversely as the densities. This rule is well known all over the world, and in order to find the specific gravity of a certain liquid, or its density, as compared with that of distilled water, it is only necessary to measure the height of a column of said liquid sustained by a given column of distilled water, and to calculate the relative proportion of the two.

In the first place, however, to measure the columns with the desired correctness requires certain precautions, and to charge a U-shaped tube with different liquids and discharge it again is coupled with such difficulties that the principles mentioned above, notwithstanding their simplicity, has never been turned to any account in practice.

The floating areometers which are in common use are subjected to the serious inconvenience of being very deficient in exactness, and it really is very rare that two instruments of this class correspond exactly with each other, neither do they give the real density nor the volume per pound.

The novel areometer of Mr. Jeannel is based on the equilibrium of two columns of liquid in a U-shaped tube, and notwithstanding this instrument is more difficult to handle than the floating areometers, it is preferable on account of its greater exactness, as it indicates the real density of the liquid, and it allows, at the same time, of making corrections necessary on account of the changing temperature. With alcoholic liquids only it becomes necessary to use tables for correction.

The instrument consists of the tubes A B and C D, which communicate by an intermediate column of mercury contained in the V-shaped vessel, M. The small tube, A B, of a diameter of about $\frac{1}{4}$ of an inch and about 22 inches long, connects with the vessel, M, being in reality a prolongation of the same, and both the upper part of the vessel and the small tube are filled with distilled water to a hight of 20 inches, which is marked 1000 on the scale. The other tube, C D, of a diameter of about $\frac{1}{8}$ of an inch and a length of about 25 inches, contains also a column of distilled water of the hight of 20 inches. This tube extends down into the mercury contained in the lower part of the vessel, M.




A siphon, S, serves to empty the tube, C D, and if this tube is emptied and filled with a liquid of greater density, it takes a column of less hight to cause the column of water in the tube, A B, to rise to a hight of 20 inches, and, on the other hand, if liquid of less density is filled into the tube, C D, a higher column is required to raise the distilled water in the tube, A B, to a hight of 20 inches. The hights of the two columns are inversely as the densities.

By proper scales on both tubes the density as well as the volume per pound of different liquids can be determined.

## POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, the 15th inst., the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; the president, C. Mason, in the chair; John Johnson, secretary *pro tem.*

### MISCELLANEOUS BUSINESS.

*Heating by Steam.*—Lewis M. Hills, of New Haven, read a paper presenting the usual arguments for warming buildings by steam. The paper was briefly remarked upon by the president and Messrs. Godwin, Garvey and Fisher. Mr. Fisher believed the largest building, or even a whole block, might be warmed by a single boiler; whereas, a single hot-air furnace would be altogether impracticable for such duty.

*Leather from Whale Skin.*—Mr. Howe read a paper prepared by D. H. Tetu, of Kamarousha, Canada, on the white whale of the St. Lawrence. The Canadians call the fish a porpoise, but works on natural history describe it as a whale; it is found for a distance of 200 miles between St. Roch (60 miles above Quebec) and Father Point; also found abundantly in rivers emptying into Hudson's Bay. Since the discovery of Canada, this fish has been an article of commerce; but the oil was not very good, and little use was found for the skin; lately, however, Mr. Tetu has succeeded in purifying the oil and tanning the skin. The oil is equal to the best sperm, and the leather has excellent qualities. The average price of the animal 10 years ago was $40, now it is $150; average weight, 2,500 lbs, and the largest, 5,000 lbs.—worth $200; average length 22 feet, and 15 feet in circumference. The ear is so small that only well-skilled naturalists can find it, yet the sense of hearing is more acute than in any other whale. Mr. Tetu catches the white whale in nets, near the river Saguenay.

In addition to the above, which is a condensation of the more important statements of the paper, Mr. Tetu, in answer to questions from various members, said that all kinds of leather are made from the skins; but it does not make good sole leather, for the reason that it is too pliable; ordinary tanning process employed, except that the limeing is omitted, and the tanning requires more time on account of the closeness of the fiber of the skin. The skin has hair (Dr. Stevens—All mammals have hair); the leather lasts five times longer than any other leather, yet costs the same; the skin of one whale is equal to the skins of 12 to 25 calves; the leather is chiefly used by the British army. Mr. Tetu may be seen at No. 77 Franklin-street, this city.

Specimens of leather were exhibited and passed among the members, and elicited general approval—especially for strength and pliability. The president and a reporter were unable, by pulling against each other, to break a strip a little larger than a shoe string.

*Fry's Revolving Window Sash.*—Mr. Garbanati exhibited a model of a window sash invented by Thomas P. Fry, of Brooklyn. The object of the invention is especially to encourage and facilitate the cleaning of the outside of the window. The sash is pivoted to guides which travel up and down in corresponding grooves of the casing. The window is thus easily turned, and the outside brought in, without detaching from the casing. The sash, also, when turned so as to be horizontal, allows as free ventilation as when the window is entirely removed.

The time allotted to miscellaneous business having expired, the president called up the regular subject—"Adulterated Food."

### DISCUSSION.

Mr. Treadwell presented for chemical examination a sample of sugar which he had used in his family, but which he believed was not genuine; it contained matter which he thought was not so soluble as sugar.

Dr. Reuben—A gentleman in New Hampshire complained that he had found sand in maple sugar; but it was shown that the sand was a constituent of the sap, and that it was formed and precipitated in the same way as cream-of-tartar is found in wine.

A lively debate here ensued between Drs. Gould, Reuben and Mr. Latson, on the question whether salt should enter into the food of man; but nothing important was brought out, and as the subject was foreign to the purpose of the meeting, we make no report of it.

Professor Hendricks—Some of the gentlemen who have spoken here give their experience as dyspeptics, and advise us to adopt what they found which suited their cases. But dyspeptics' rules are not what healthy men should follow. It is safer to do precisely what dyspeptics forbid. (The professor made a stirring speech, and sat down amid applause and laughter.)

Mr. Seely presented four samples of carbonate of soda procured from respectable grocers, and sold under the name of saleratus or super-carbonate of soda. The powders were dissolved in separate vessels of water, and a solution of bi-chloride of mercury was added to each. The clear solutions immediately changed to a dark, dirty red, and a bulky precipitate soon settled. These tests showed that the super-carbonate of soda commonly sold is little better than common washing soda effloresced or dried. Had the articles been genuine, the precipitate made by the bi-chloride of mercury would have been white.

A gentleman (whose name our reporter did not learn) said:—I was once engaged in manufacturing saleratus, and sent to a baker a lot of genuine super-carbonate of soda. But the baker found that it made his bread yellow, and returned it to us. We then mixed it with 25 per cent of salt, and the baker found it of the best quality.

Mr. Seely—But the baker's bread might not have been any better. Almost any mineral matter makes pure bread whiter; alum was once commonly added to bread to whiten it. In Belgium it is said that sulphate of copper has been used; 1 part in 70,000 of flour answering the purpose. Liebig recommends lime, for the reason that lime is an essential element of the body.

The President—Pure wheat will not make white bread. Whiteness is not a desirable quality of bread; it is generally an evidence of fraud or ignorance.

Mr. Fisher—I found the bread in Florence yellowish, but excellent; better than I have found elsewhere. I do not know how bread is made here, but it is all bad.

Mr. Garbanati commended the French bread, which, he said, may be procured at various places in New York and Brooklyn.

Mr. Latson—The superiority of French bread is due rather to skillful manipulation than to any difference in ingredients used. A French baker will use precisely the same materials as other bakers, and yet invariably make a better bread. His skill consists chiefly in determining the point when the raised loaf should be put in the oven; he does not allow the fermentation to go as far as to make the bread sour or to give it a disagreeable flavor. He never works over his dough after it is once raised, as is evident from the fact that large cavities are always found in his bread.

Dr. Reuben—No substance whatever which is not an element of the body should be taken into the system. The effect of foreign matter constantly taken in is cumulative; and if it does not appear in a day, it surely will during the lifetime. It is only after a considerable time that painters feel the effects of lead.

Dr. Stevens—An impression has gone from this club that cattle are very much damaged by the transport from distant places; this I consider an error. Cattle are brought even from Texas, but they start in the Spring and do not reach here till Fall. On all railroads which carry cattle, there are stations at intervals of 200 or 250 miles where the cattle are taken out and receive every needful attention. If any of them are disabled by disease or accident, they are generally left behind and sold in the neighborhood. (The doctor here named the various railroads which transport cattle towards New York, with all resting stations.) It is my belief that in New York we have the best beef in the world; that no finer cattle can be found in any other market.

Mr. J. Lamb presented samples of pure ground spices prepared in Brooklyn. He said that the manufacturer had come from Europe, where he was engaged in the manufacture of certain kinds of sauce. When he attempted to make his sauce here, he found that he was producing a very different article. The black pepper he bought was largely adulterated with rottenstone and pummice stone. He was obliged, in order to carry on

his business successfully, to grind the spices himself. Some spices (especially pepper) should only be crushed, and the husks separated by a sieve. Cayenne pepper is adulterated and colored with red lead; he had known a case of lead colic produced by eating such pepper. Spices should not be put up in papers.

The President—Every article should be labeled with its proper name, quality and the name of its manufacturer. A law requiring this of all articles to which it would be practicable is perhaps the extent of useful legislation against adulterations.

The subject for the next meeting—"The Means of Conveyance to and from New York"—was then agreed upon, and the association adjourned.

## AMERICAN NAVAL ARCHITECTURE.

[Reported expressly for the Scientific American.]

### THE STEAMER "R. R. CUYLER."

The *R. R. Cuyler* has been completed only two or three weeks, and at the time of our writing has made but one trip to the port of her intended service; yet this limited trial, in which the many improvements introduced in her erection were thoroughly and properly tested, gave the greatest of satisfaction to all that were interested in her success. Full particulars relative to hull and machinery will be found annexed:—Length on deck, 235 feet 6 inches; breadth of beam (molded), 38 feet; depth of hold at beam, 17 feet 6 inches; depth of hold at spar deck, 23 feet 3 inches; draft of water at load line, 15 feet 6 inches; length of engine space, 66 feet 3 inches; area of immersed section at load draft, 548 square feet; tunnage, 1,600 tuns. Her frame is of white oak and chestnut, and square fastened with copper and treenails; distance apart at centers, 24 inches, and filled in solid for length of whole floor; secured by iron straps double and diagonally laid, 4 by ⅝ inches; cross floor (molded), 14 inches, and sided 10 and 12 inches.

The *R. R. Cuyler* is fitted with a vertical direct engine; diameter of cylinder, 70 inches; length of stroke of piston, 4 feet; diameter of propeller, 16 feet; length, 4 feet 9½ inches; pitch of same, 22 feet 6 inches, and has 4 blades.

She has two horizontal tubular boilers; length, 17 feet 5 inches; breath, 13 feet 6 inches; hight, exclusive of steam chests, 13 feet 9 inches. They have 6 furnaces, the breadth of which is 3 feet 11 inches; length of grate bars, 7 feet 8 inches. The number of tubes in these boilers is 288; internal diameter of same, 4½ inches; length, 14 feet 5 inches. Diameter of chimney, 4 feet 3 inches; hight of same above grates, 21 feet. The boilers possess a heating surface of 6,258 square feet; capacity of bunkers in tuns, 170. Average revolutions, 36; depth of keel, 12 inches; does not use blowers to furnaces; boilers located in hold; one smoke pipe; one independent steam, fire, and bilge pump; one bilge injection, and bottom valves or cocks to all openings in bottom; two masts, foretopsail schooner rig; has an independent rudder post.

She possesses two decks for freight, above which is the large and comfortable cabin, capable of accommodating in the best manner 220 passengers, with berths and state rooms. Above this cabin is situated the spacious dining saloon, the ladies' saloon, various pantries, and officers' quarters. The upper saloons are paneled in oak, and the lower cabin is beautifully furnished; the entire woodwork being polished white and gilt. Broad flights of stairs connect the two saloons.

This steamer cost about $142,000, and composes, with three other vessels, the line running between New York City and Savannah, belonging to H. Cromwell & Co. The hull was built by Samuel Sneden, of Greenpoint, of the best material and in the most substantial manner. Builder of engines and boilers, the Allaire Works, this city.

### STEAM FERRY-BOAT "PACIFIC."

Within a few weeks the Union Ferry Company have added another splendid boat to their many others, and it is now running on the East river, between Whitehall-street, this city, and Atlantic-street, Brooklyn. Below will be found some of the particulars of hull and machinery:—Length on deck, 180 feet; breadth of beam (molded), 33 feet; depth of hold to spar deck, 14 feet; draft of water at load line, 6 feet 3 inches; tunnage, 650 tuns. Her frame is of white oak, chestnut, &c., properly and securely fastened with rivets and treenails. Built in 1859; has one independent steam, fire, and bilge pump; one bilge injection; does not use blowers to furnaces; one smoke pipe, ; water bottom to boiler. Is fitted with condensing engine and drop; flue boiler; built by Neptune Iron Works, this city.

She is protected from communicating fire by having felt on boiler, space above same, and iron around chimney. Her bows are sheathed; has water wheel guards, fore and aft. Splendid saloon cabins on side · one anchor and two life-boats.

### THE STEAMER "PERUANA."

This steamer, a fine and complete specimen of naval architecture, has just reached completion, and is now making her first trip to the ports of her intended service, on the coast of Peru. Subjoined will be found minute particulars of hull, engine, and boilers:—Length on deck, 180 feet; breadth of beam (molded), 29 feet 6 inches; depth of hold, 11 feet 3 inches; depth of hold to spar deck, 7 feet 3 inches; length of engine and boiler space, 65 feet; area of immersed section at load draft of 6 feet, 169 square feet; tunnage, 560 tuns.

Her frame is made of white oak, chestnut, and hacmetac, and square fastened with copper and treenails; the frames are filled in solid, distance apart, 31 inches; cross floors (molded), 12 inches, sided, 7½ inches, and these are secured by double laid and diagonal iron straps, 4½ by ⅝ inches.

The *Peruana* is fitted with a vertical direct-acting engine; diameter of cylinder, 44 inches; length of stroke of piston, 11 feet; diameter of water wheels (over boards), 27 feet; length of boards, 7 feet; depth of same, 22 inches; number of blades, 24.

She has two return flue boilers; length, 24 feet, 6 inches; breadth, 8 feet 6 inches; hight, exclusive of steam drum, 8 feet 3 inches; number of furnaces, 2 in each boiler; length of grate bars, 6 feet, 9 inches; have 10 flues in each boiler, whose internal diameters are 15, 16 and 12 inches; length of flues, 20 and 14 feet. The smoke pipe extends 32 feet above grates; bunkers, made of wood; capacity of same, 120 tuns, and the daily consumption of coal is expected not to exceed 12 tuns.

Her maximum pressure of steam is 25 lbs.; maximum revolutions at this pressure, 18; the boilers are located in the hold; does not use blowers to furnaces; she has 3 water-tight bulkheads, and a large and pleasant cabin on deck; water wheel guards fore and aft.

In addition to these she is fitted with one independent steam, fire, and bilge pump, one bilge injection, and has bottom valves or cocks to all openings in her bottom; and is protected from communicating fire from the boilers by felt and sheet iron. Builders of hull, J. Westervelt & Sons; builders of machinery, Morgan Iron Works. The vessel is owned by Charles A. Dimon and others.

## IRON AND WOODEN SHIPS.

Messrs. Editors:—On page 131, of the present volume of the Scientific American, you propose to enlighten your readers on on the subject of naval architecture—a most praiseworthy purpose—but, alas! they are doomed to disappointment, unless the editors change their course, and give their readers something more than the opinions of "eminent ship builders," as quoted on page 180.

Every reader of your journal knows that you are favorable to iron ships, and that you give them the preference over those built of wood; but who has ever found in your journal one single reason why iron ships should have the preference in this country? The "eminent shipbuilder" to whom you refer has an object in view, beyond his country's good. If you will permit him to come to the witness-box it will be shown through the Scientific American that it is *not* for the best interests of the United States that her merchants should go into iron shipbuilding, except for river navigation, where the lightest draft of water is demanded. Is it not because ships are not remunerative that our shipyards are idle? If a wooden steamship of a given size, costing $200,000, will not pay, will she pay if built of iron, of the same size and capacity, and costing $250,000? Does the increased cost make her more profitable? Again, we are told that they are stronger than wooden ships; does the increasing list of shipwrecks of iron-built ships prove it? Does it not rather prove the converse to be true? That iron may be more fully represented in the construction of this noble fabric, we fully admit, but deny that it is the best material of which to build the external of the hull; and we think the editors will agree with us, if they will give the subject a fair amount of investigation. Why does England build iron ships? Is it not in conformity with her best interests to export her iron in a manufactured state, and would she not build her ships of wood if she could get it without importing it? Undoubtedly she would? It has always been her policy (and should be *ours*) to sell more than she buys, and, when one of her staple products has become exhausted, to substitute something else, so that her commercial policy may be maintained. And when the people of the United States shall have learned that the perfection and manufacture of wooden ships is one of the most profitable of all our exported fabrics, then we shall discover whose interests the "eminent shipbuilders" and iron-workers are advocating when they talk of iron ships. May we not hope that you will allow this subject to be ventilated through the columns of your journal? Although your humble servant may lay no claim to "eminence" as a shipbuilder, yet he will pledge himself to show that either *ignorance* or *avarice* forms the basis of all projects for substituting iron for wood in the outer shell of our ships. If the "eminent shipbuilders" will labor as assiduously to improve the models of American ships, as they have to favor British policy and British interests, we should find even England herself willing to admit that *not Britannia but Columbia* rules the waves.

John W. Griffiths.

Navy Yard, Philadelphia, Pa., March 17, 1870.

[An answer to the above will be found on page 217. We are positive that the last clause of the above is an unwarranted insinuation against the patriotism of our shipbuilders. We are confident that the charge of any one of them having labored assiduously to favor British policy and interests cannot be sustained.—Eds.

## ENGLISH LOCOMOTIVES ON A "BENDER."

An amusing case recently came before the Court of Queens Bench at Westminister; we find it reported in full in the London *Times*:—The plaintiff in the action, James Washington Myers, was by birth an American, and had acquired considerable celebrity, in England by his equestrian performances. His services were in great request, and for some time he served under the auspices of Messrs. Hawes & Cushing, at the weekly wages of 45 shillings. In the Spring of last year these gentlemen offered to increase his weekly allowance if he would continue with them; but having the "Young America" spirit in him, he declined the offer and started a company on his own account, with which he traveled from place to place, giving performances. When about to "go the circuit" the plaintiff's attention was attracted by an advertisement of "Bray's Patent Traction Engine," designed for draw-carriages &c., upon the common road by steam power, instead of the ordinary means of locomotion by horse-flesh. It occured to him that if he could get one of these engines to answer his purpose, it would both save the expense of horses in carrying his "Pavilion" round the country, and would at the same time "astonish the natives," and act as a grand advertisement of his exhibition. Accordingly, he applied to the defendants' company, and on the 16th of June, Mr. Hanson, the secretary, wrote him a letter saying that he thought it could be be arranged to let him have an engine, but as the directors had two other proposals before them, he must decide by the next day. He accordingly attended the board the next day, and told the directors what he wanted the engine for; and that if it would not go at the rate of seven or eight, or six miles an hour, it would be of no use. They said it would go seven or eight miles an hour with great ease, and would carry 20 tuns at seven miles an hour, though they would not like it to go at that speed, but it would go five miles an hour well. The plaintiff told them he did not want to go more than five miles an hour. The next day the draught agreement was sent to him, but it contained a stipulation that the plaintiff was not to work the engine more than three miles an hour, and as that speed would be of no use, he altered the "3" to "5," and with that alteration the company executed the agreement under their seal. The agreement was dated June 21, 1859, and by it the defendants agreed to let the plaintiff their traction engine "No. 1" for three months from July 11, 1859, at the monthly payment of £65, to include engine-driver's and steerer's wages. As the engine was to be made an advertisement, the plaintiff gave directions that it should be painted with all the colors of the rainbow, and he

placed on the top of it a huge dragon painted green. He also gave instructions that all the country through which he intended to progress should be posted with gigantic pictures of his procession, and that his arrival should be made extensively known by advertisements in all the towns and cities through which he was about to make his circuit. The monster engine after one preliminary break down, was delivered to him at the Pavilion, in Whitechapel, on the 9th of July; and on that day the plaintiff and his troop in five vans, drawn by the engine "No. 1," started for Camberwell. It took seven hours to reach Camberwell, and the driver accounted for his slow progress by saying it was necessary to go slowly in order not to frighten the horses in the streets. From Camberwell it took 10 or 11 hours to reach Croydon, though the engine had only 11 tuns to draw. On entering Croydon the procession was formed in the midst of a large and wonder-gaping crowd, but all at once the engine stood still, the reason assigned for which was, that the waterpipe was putting the fire out. The people began to hiss and hoot, and the plaintiff got away to his hotel, and after his performance came up to town and saw Mr. Hanson. Another engine, "No. 4," was then sent down as a substitute, and with that the plaintiff started to Bromley, and next day to Dartford, where "No. 4" stood still in the middle of the road. The steerer said one of the pumps had got out of order, and it was impossible to go on that day. The plaintiff could not perform at Dartford, and came back to London, and saw Major Campbell, one of the defendants, who said he was very sorry, and told him to go back and get horses, and the company would pay for them. He accordingly got horses, and went to Dartford and Gravesend with his company, and performed. In consequence of the delay thus occasioned, the plaintiff said he was unable to keep his engagements; and the great expense which he had incurred in advertisements and procuring large colored posters from New York was thrown away. The engine "No. 4" rejoined the plaintiff "on circuit" at Rochester; and on leaving that city for Maidstone, "No. 4" took a start down a hill at the rate of about 60 miles an hour, but was stopped by running against a bank, breaking several of the carriages. The plaintiff left the engine on the road, and went on to Maidstone with horses, and then came up to London and explained to the directors what had happened. It was then arranged that the plaintiff should have William Bray, the son of the inventor, as his driver; the previous driver being considered incompetent, and eventually William Bray made his appearance at Tunbridge Wells with a new engine, "No. 6." Affairs went on pretty well for about a fortnight; but when the "circuit" arrived at Dover some difficulty was made by the turnpike man about the toll. On one occasion the plaintiff said he had been compelled to pay as much as £11 for toll; but when he arrived at Dover he took the precaution to go into the town and consult an attorney as to the amount of toll which could legally be demanded, and being informed that 4s. 6d. was the legal toll he tendered that sum. The gatekeeper, however, was not satisfied, and refused to open the gate; and thereupon the plaintiff, being determined to "go ahead," ordered the engine-driver to drive through the gate. This was accordingly done, as the gate presented but a feeble resistence to the monster engine; and the plaintiff of course, got involved in some legal disputes. The next mishap occurred in Brighton, where the procession was then making the parade of the town. On that occasion the crank-shaft broke. This obliged the plaintiff to come to London to get a new shaft, and again to hire horses to Worthing and Chichester. The engine went all right to Winchester, but there the water put the fire out. During this period the plaintiff wrote frequent letters to the defendants and complained of the engine as useless, but he still took it on with him, though it was unable to do more than carry itself along. The plaintiff went to Basingstoke and Newbury, at which latter place the engine became a wreck, and the plaintiff came up to town to see the defendants on the subject. On the 19th of September for the first time, the defendants complained that the plaintiff had not used the engine fairly, and a correspondence took place by letters and by telegrams. The engine was repaired at Newbury, and was got to Swindon, but on going down Swindon-hill it was thrown aside on a bank. The plaintiff was tossed into a thicket and the stoker into the fire-hole. It was then sent on by rail to Cheltenham, and finally it arrived in Birmingham in the beginning of October, where it was still kept by the plaintiff on account of money which he said the company owed him. The plaintiff stated that on the day before the trial the engine "No 4" had been brought down to New Palace-yard, and that it took seven minutes and-a-half by his watch to get it across the gutter.

On cross-examination the plaintiff stated that he had been two years in England, and this was the first expedition which he had taken on his own account. His vans were from 10 to 11 tuns only. He persisted in his statement that the directors said the engine would go five miles an hour, and that he never heard three miles mentioned. He admitted that he was anxious to have the engine, and that on the day he signed the agreement he heard that Mr. Collum had one of them, but he did not go to see it. The plaintiff was then cross-examined as to his having seen a copy of a letter which the defendants had written to to Mr. Cooke, of Astley's, to the effect that the company would not incur any legal liability in respect of the engine, as the proposed application of it was a novel one; but he positively denied that any such letter had been shown him by the directors. He was then cross-examined as to his performances, and stated that he lost several in consequence of the slowness of the engines; but he at the same time admitted that some of his performances were very successful. Mr. Hanson had told him "No 6" was a new engine, and had not been tried, but he did not say he must take it at all risks. He told the company it would be worth £10,000 to them as an advertisement, as he should take it to all the principal towns in England; and he might have said it was worth £200 to himself in each town as an advertisement. The plaintiff was made to tell the story of his charging through the tollgate at Dover, and then taken through the various particulars of the damage which he claimed. One head of claim was for £3,000 for "damage to reputation;" and he said, when questioned on that point, "Well, Sir, I would not take £3,000 for my reputation," and that he could not show himself again in the towns where he had failed to keep his engagements. He said the best part of his journey was the road into Portsmouth, on which he traveled 18 miles in about nine hours. He gave an account of what he called a "Yankee trick," which he had played upon a person named Croft. When he found it was impossible to go on to the next place, because they could not get up the steam, he got Croft to give him £40 to stay and perform the next day. He said he had no intention of leaving England, though his "last appearance previous to his departure for America" had been advertised, but that was only a customary form adopted when it was wanted to draw a full house.

After considerable discussion it was agreed that there should be a verdict for the defendants on the count in the declaration alleging fraud, and that a verdict should be taken for the plaintiff upon all the other counts, subject to a reference.

A CAUTION TO TRAVELERS.—Many persons, in passing from one car to another, while a train is in motion, are accustomed to steady themselves by grasping the horizontal wheel used for winding-up the brake, which projects above the railing on the platform of the car. This habit has now become an extremely dangerous one. Several of the leading railroads are beginning to use a new kind of brake, which, in case of emergency, can be set almost instantly without the presence of the brakeman. Should such an emergency arise while a passenger was steadying himself by one of the wheels, it would, without the least warning, commence to revolve rapidly, and he would lose his hold and run great risk of falling between the cars. This is felt to be so real a danger that the latest patterns for the wheels are made with a web in them, rendering it impossible for the hand completely to encircle the rim of the wheel. This, however, but slightly obviates the danger. A careful man will shun them entirely.—*J. W. Sprague.*

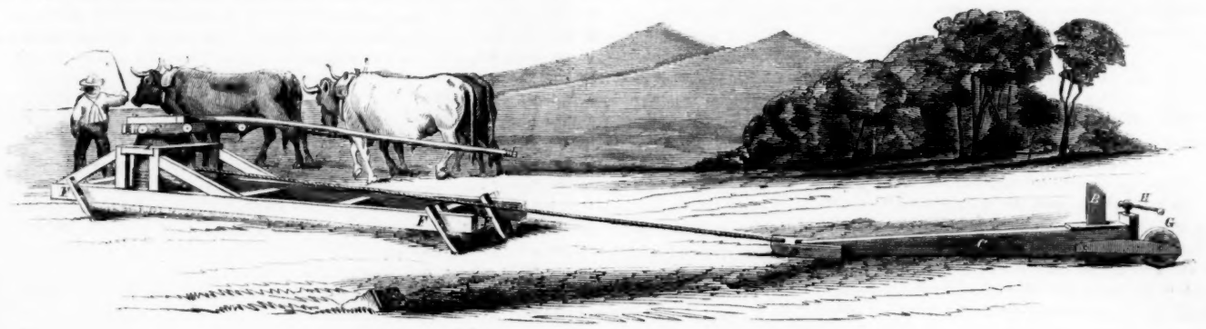
ENDER'S SELF-CLOSING INKSTAND.—The inventor of this neat and simple closing for inkstands informs us that the drawing which he sent us for our cut should have shown a shoulder in the cone, so that it would be pressed open by the sides of the pen without allowing the point to come in contact with the metal. This is, of course, an essential point in the value of the invention.

## A COLUMN OF VARIETIES.

Burning fluid is a mixture of alcohol and camphene in the proportion of about four gallons of alcohol to one of camphene. Camphene is simply spirits of turpentine re-distilled.....The Rhode Island Society for the Encouragement of Domestic Industry have just received from Capt. Harris an old English cross-gun, which has the name of the maker, "Richardson," "Manchester," on one of the sights. It was made to carry a ball instead of an arrow, and the bow is of steel.....In the best turbine wheels, the buckets are made of brass and very smoothly polished.....The case of the Irish bruiser, Heenan, who has gone to England from this country to have a fight with a notorious English bully of the name of Sayers, has attracted the attention of the British Parliament, and the question has been asked whether the police would prevent the brutal exhibition.....The Lockhaven (Pa.) *Watchman* records a very remarkable phenomenon, just being perfected in Lockhaven. Some months ago, Mr. John Johnson, of that place, had the middle finger of his right hand amputated close to the lower joint joining the hand. The wound soon healed over, and almost immediately a new finger commenced growing from the stump of the old one, and six months from the time the finger was amputated Mr. Johnson had a new and full grown one in its place, with the exception of the nail, which is just commencing to shoot out.....Dr. Hayes, of Arctic fame, in his recently published work, expresses the opinion, based upon experience, that to men living on a short allowance of food, in a cold climate, where special stimuli are required, there is nothing as valuable as coffee. Tea is not much prized by explorers in frozen regions. To Arctic travelers, the doctor adds, spirits in any form are in almost every case worse than useless, while coffee is always grateful and always beneficial..... In many of the Letters Patent which are brought to us to use in illustrating and describing inventions, it is surprising to see in how bungling a manner many of the specifications are drawn by the inexperienced or incompetent persons who prepared them.....Mitchell's *Steam Shipping Journal* says that the only reason why side wheels are used for steamships is the prejudice of the traveling public in their favor; that all shipbuilders and owners are satisfied of the superiority of screw propellers.....A correspondent of the Ohio *Cultivator*, who is a tile-maker, says that he can make and sell 3-inch sole tiles for 20 cents per rod, and that he can dig, haul, lay the tile and fill up a drain 2 feet 10 inches deep for 6 cents per rod, making the tile drains cost 26 cents per rod. He also says that the owners of mole plows charge 15 cents per rod for making drains 3½ feet deep.....Mr. Gould, of Hudson, N. Y., stated, in one of the New Haven lectures, that there are 3,000 species of grass.....Daniel Webster once said that all over the world, and in all times, the agricultural regions devoted to grazing were more prosperous than grain-growing districts.....The tubes of tubular bridges are painted nearly white, so at to increase the radiation and to diminish the effects of alternations of temperature.....In cases where one blade of a double-bladed screw-propeller has been broken, a fair rate of steaming has been maintained with the remaining blade.....A 2-inch square bar, of the best and most fibrous Lowmoor iron, has been completely crystallized by being hammered by two men for half an hour.....Sea-weed, like all other vegetables, grows most rapidly (out of the tropics) in the spring of the year, and at this time gives most trouble by collecting upon the bottoms of ships.....The fluidity of the Berlin iron, from which the finest and sharpest (although not the strongest) castings are made, is attributed to the presence of arsenic in the iron.....Hard cast iron, when cast in very large masses, and allowed to cool very slowly, is found to become soft. Heavy guns, when cast solid from hard iron, are found to bore easily.....The blue flame, sometimes observed at the tops of the funnels of steam vessls, does not extend down the funnel. It is caused by the combustion of carbonic oxyd, which can only burn by meeting fresh air at the top of the funnel, the mixture igniting at a comparatively low temperature.....Work's *odometers* (illustrated and described on page 300, Vol. XIV. of the SCIENTIFIC AMERICAN) are now extensively used among livery stable-keepers in the eastern States, for measuring distances, and in many cases the individuals who go off for a drive of five or ten miles, and take twenty, are brought up "with a round turn" by this contrivance, and often to their great astonishment.

## IMPROVED MOLE FOR DRAIN PLOWS.

Evidence of the wide-spread and rapidly-increasing interest in under-ground draining pour in upon us from every direction, and in the nature of things this interest can hardly diminish, for the land in the country capable of being enormously increased in value by this process is to be reckoned, not by acres nor by hundreds of acres, but by thousands of square miles. For many years to come, most of this work must be done by the mole plow, for in a very small portion of the country is land



LANE'S IMPROVED MOLE FOR DRAIN PLOWS.

yet sufficiently valuable to justify the enormous expense of laying drain tiles. Hence, the great amount of attention which our inventors are giving to this subterranean implement.

The annexed engraving gives a very clear idea of the process of forming under-ground drains, by means of the

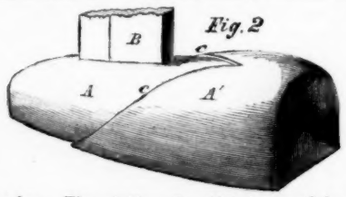



*Fig. 2*

mole plow. The windlass, E, which is turned by the team attached to the end of the long sweep, is securely fastened to a frame which is provided with the anchors or stakes, F F F, which enter the ground at an inclination towards the plow, so as to hold the frame securely in place while the plow is being drawn up to it. A stout rope, say 120 feet in length, connects the plow with the windlass so that as the rope is wound-up the plow is drawn along. The plow is secured to the long timber, C, the forward end of which rests upon the sledge or stone boat, D. In the back end of the timber, C, the upright post or cutting-knife, E, is firmly mortised, the joint being strengthened with heavy irons. At the lower end of the knife, E, some three feet below the surface, is the mole which forms the drain. This mole is a conical or semi-conical mass of iron, and by being forced forward through the ground forms a long channel or pipe for the passage of the water, which in certain soils remains open for a surprising length of time.

The particular improvement which we now illustrate consists in the form of the mole, and is shown in Fig. 2. A is the forward point or edge of the mole, and B the vertical knife to which it is secured. In order to close the upper part of the drain more perfectly than has hitherto been done, the square projections, *c c*, are made sloping upward and backward from the bottom of the mole and coming together about midway from the knife to the back end of the mole. These projections cut off the clay which has been compressed against the sides of the channel and carry it to the top, closing the opening made by the knife, and sealing the top of the channel with hard compressed clay, and thus leaving it in condition to be far more durable than if made by a mole without these square projections. The roller, G, follows the knife on the surface and there closes the slit made by the knife. The screw, H, is provided for the purpose of regulating the depth of the mole beneath the surface.

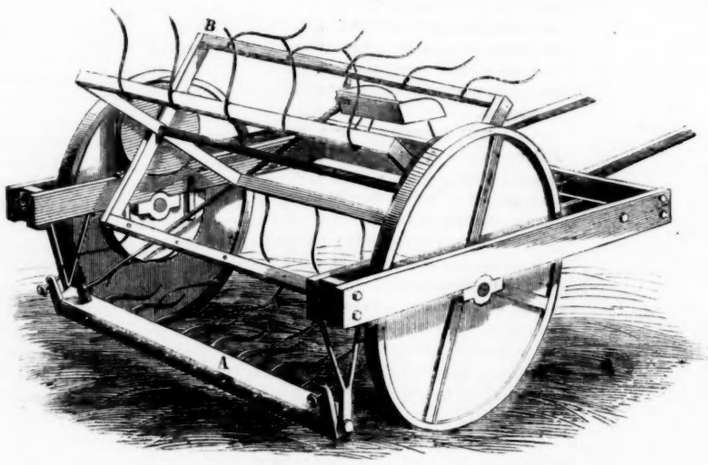
When the windlass is wound full of the rope, the team is removed from the sweep and attached to a staple at the forward end of the frame, when a stout pull draws the anchor from the ground, and the frame is drawn forward the length of the rope. The team is now again attached to the windlass and the effect of the first strain upon the rope is to sink the anchors again into the ground and secure the frame, after which the plow begins to move and the work proceeds as before.

The patent for this invention was procured through the Scientific American Patent Agency, Jan. 10, 1860, and any further information in relation to it may be obtained by addressing the inventor, John Lane, at Lockport, Ill.

## IMPROVED HAY-MAKER.

Of all the operations of haymaking the prettiest is the tedding. It is a pleasant sight, as the dew is off in the morning, to see the boys follow the mowers with their *own* light forks (for what boy never had a favorite fork to which he applied the rub stone with the mowers?) knocking the grass to the right and left from the swaths, and spreading it evenly over the ground to dry. The labor, too, of turning the hay after dinner is light and agreeable work, but it seems that even these easiest and cleanest operations in farming are destined to be done by machinery, and the tedding boys are to be promoted into comfortable seats, and will ride about the field in ease, making actual sport of the labor. Are not our inventors absolutely ushering in the very dawn of the millennium?

*Fig. 1*




GOFF'S PATENT HAY-MAKER.

The graceful machine represented in the engravings consists essentially of two rakes—one stationary near the ground for slightly lifting the grass or hay, and the other a revolving rake which throws the hay into the air and leaves it turned up to the sun in the lightest manner possible. The stationary rake, A, has a slight rocking motion, by which the ends of the teeth may be turned up from the ground to avoid any stone, stump or other obstacle which may be encountered, or to be out of the way in transporting the implement to and from the field. This tipping motion is effected by means of the handle, C, Fig. 2, operating the rod, D. The same motion of the handle, C, which drops the teeth of the stationary rake ready for operation also throws the revolving rake, B, into gear by drawing forward the pinion, E, which is fastened upon the axle of said rake, into the position shown in the cut; this axle having one of its bearings in the slide, F, which is connected with the rod, G. The

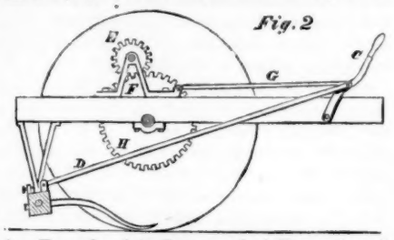



*Fig. 2*

pinion, E, meshes into the gear wheel, H, on the axle of the driving wheels, and may be thrown into or out of gear by sliding the slide, F, through the rod, G, and handle, C, as shown. Thus, when it is not desired to operate the machine, the labor and wear of turning the rake are avoided.

The patent for this invention was obtained, through the Scientific American Patent Agency, June 14, 1859, and persons desiring further information in relation to it will please address the inventor, Thomas I. Goff, at Warren, R. I.

THE FLIMSINESS OF SCOTCH BUILDINGS.—In recent news from Europe, we are told that "the picturesque marine terrace erected by the late Lord Murray (at a cost of £6,000) on a spur of the Castle Hill, Edinburgh, has given way, owing to the defective foundation, and become a mass of ruins." This is the general character of Scotch and English structures—apparent solidity above, combined with utter want of thoroughness in the foundations. They generally fall down. It is not long ago that a whole row of buildings in London came down with a crash; and it is thought that the whole city will one day tumble in ruins, crushing its inhabitants into a mass of jelly. This will probably be the grand finale of the last experiment in aristocratic government, and the world will immediately return to absolute despotism!

WE see by the London *Engineer* that our manufacturers of portable engines find it an object to advertise their machinery in England.

# Scientific American.

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VOL. II., NO. 14.....[NEW SERIES.]....*Fifteenth Year.*

NEW YORK, SATURDAY, MARCH 31, 1860.


## WOODEN AND IRON SHIPS.

EVERY question of an important character requires calm, careful and candid investigation in order to arrive at correct conclusions. At the present moment the above-named subject is justly engaging much attention among our naval architects and shipping merchants. In Europe it is already settled in favor of iron vessels, but with us it is far otherwise. As facts are the only reliable arguments that cannot be refuted, this question cannot be decided by mere assertions. On another page we publish the letter of Mr. J. W. Griffiths, the well-known naval architect, in which he makes several statements that require correction, both for his own sake and that of others (if there are any) who may have imbibed similar notions. He states that we proposed, on page 131, present volume of the SCIENTIFIC AMERICAN, to "enlighten our readers on the subject of naval architecture;" that we "are in favor of iron vessels and give them the preference over wood;" that the eminent shipbuilder, whose opinions we quoted on page 180, in regard to iron ships "has an object in view beyond his country's good;" and that "either ignorance or avarice forms the basis of all projects for substituting iron for wood in the outer shell of our ships."

We are surprised that Mr. Griffiths should make such charges against those who differ from him in opinion, more especially as they are totally devoid of reliability. We never proposed to enlighten our readers on the subject of naval architecture. It was stated on page 131 that it would afford us much pleasure to receive communications on the subject from practical shipbuilders; that is all. The eminent shipbuilder against whose opinions ignorance, avarice and self-interest are insinuated, is altogether interested in building timber vessels; he is a man of reflection, long experience, and has had great opportunities of observation. We have no *preferences* for iron over wooden vessels; such a term is entirely misapplied to us. We examine facts, arrange and compare them, and upon these we express opinions. This we have done on this question, with impartiality, for we have neither had professional prejudices nor personal mercantile interests to warp our judgment in the investigation. We do not pretend to infallibility, but the facts which we have presented have never been refuted; and Mr. Griffiths himself has come round to such opinions, in all but the *outer shell* of ships, while Donald McKay has come wholly up to the iron standard. Let us give us a brief review of the question as it was and as it now stands.

Three years ago we directed attention to the great increase of foreign screw steamers, on page 285, Vol. XII. (old series) of the SCIENTIFIC AMERICAN, and showed clearly how they were rapidly taking away the trade that had been formerly carried on by American ships. From opinions expressed by such authorities as Mr. Griffiths, we then stated that as wooden screw steamers could be built as cheaply here as those of iron in England, our merchants should endeavor to regain their lost trade by building such. We said: "The longer they delay, the weaker and less able will they become for the struggle, while their rivals will be growing stronger and stronger, and increasing in wealth, power and influence." Our merchants did not heed this injunction, and, as a consequence, their rivals have grown stronger, while they have become weaker. Twenty-five years ago the whole Atlantic mail and passenger, and most of the goods traffic, was carried on in American bottoms; to-day nearly all the mail and passenger, besides a great deal of the goods traffic, is carried by foreign ships, the great majority of which are iron screw steamers. These facts are indisputable; how can we account for them but upon the theory that iron screw steamers—all things considered—are the cheapest and best for such traffic? By careful inquiry, backed up by many new facts, we expressed such an opinion (not a *preference*, as Mr. Griffiths calls it) on page 365 of our last volume. We said: "This is no time for boasting of what we have done or what we can do, but of speaking by deeds. We have lost and are still losing our carrying trade, from the competition of a class of steamers the efficiency and economy of which our people do not yet appreciate—iron screw steamers." A short time after these opinions were published, a letter appeared in the Boston *Traveler* from Donald McKay, then in Europe, in which he said that iron and steel "as materials for shipbuilding had proved more economical than timber in the long run, and it is high time that our shipbuilding merchants turned their attention to the subject." This was a remarkable coincidence of opinion, in support of the one we had expressed. We exhort our shipping merchants to examine the question candidly for themselves and not be guided by any man's opinion; let them take facts, and not assertions, as the basis of their operations, for we assure them that while some of our nautical architects are indulging in vain disquisitions, "the Philistines are upon them." We have not a single new Atlantic steamship on the stocks, from one end of the country to the other; while in Great Britain there are 16,000 tuns of new iron screw steamers building for the American trade These are ugly but indisputable facts to which our shipping merchants would do well to take heed in due season.

## THE LEATHER-DEALERS AND THE LYNN STRIKERS.

It would seem that for muddling the mind there is nothing like leather. The utter ignorance of the forces which regulate the wages of labor and the general distribution of wealth, displayed by the shoemakers of Massachusetts in their strike, has received a countenance and parallel from a very unexpected quarter. It is known that the notes of the leather-dealers in this city rank A 1 in the money market. This is the class of men who do not fail. They are the solid men of New York. But it seems that in their comprehensions of the nature of wealth, and of the influence of its production upon its distribution and accumulation, they are just as foolish as the shoemakers of Natick. They have just issued a circular the object of which is to persuade the tanners of the country that these manufacturers would make more money by suspending a portion of their works. To advise the shoemakers to purchase and read "Wayland's Political Economy," would doubtless be breath or ink thrown away, but it would seem that the gentlemen who ride down leisurely from their brown stone houses at 10 o'clock in the morning, and fill the earliest omnibuses in the afternoon, might find time for the task, for it is not a large volume.

Wealth does not consist of gold and silver only, but of all articles of merchandise in the community. It is being constantly produced and constantly consumed. The more there is produced in the community the more is there to divide between the capitalist and the laborer. When ready-made clothing, food and all other objects o human desire are rained down spontaneously from the skies, then may the laborer improve his condition by ceasing to work, and the manufacturer grow rich by suspending his operations. But in the present order of things, there is but one way for classes or communities to accumulate wealth, and that is by producing more of it than they consume; in other words, by industry and economy.

## ACTIVITY AND INDUSTRY OF INVENTORS.

The list of claims furnished us by the Patent Office, and published weekly in our columns, shows the progress of inventions in this country, without requiring any statistics to convince our readers, at home and abroad, that the inventors of our land are not asleep or inactive. There never has been a time when more industry was manifested by inventors than the present; and we have never known of so many sales of patents, at remunerative prices, as we have lately. The claims on another page indicate that one hundred and five patents were issued for the week ending March 20th. In looking over this list, we are happy to recognize the names of many of our own patrons among the number. Forty-one of the patentees whose names appear in this week's list had their papers prepared at, and their applications conducted to a successful termination through, the Scientific American Patent Agency. We presume we are safe in asserting that there were never before so many Letters Patent issued to the clients of a single agency in this or any foreign country in one week, and some of them are on very valuable inventions, and will be the means of promoting their owners in some cases from poverty to a competence, perhaps to affluence, if judicious means for introducing their inventions to the public be brought into requisition.

## WORKING STEAM EXPANSIVELY.

The practical application of high pressure steam as a mechanical force, and the economical generation of it, are items of no small interest to the manufactnring community at large; and the immediate object of this article is a few remarks upon the existing state of affairs in this city as regards its use and control. As a general principle, high pressure engines obtain a much greater degree of popularity than low pressure, and the reason may be found in a variety of causes, the chief of which are a lessened first cost, greater simplicity of construction, and others which are not necessary to speak of; therefore our observation is confined solely to them. We find that in by far the greater part of the places where steam power is used, the principle of expansion, if practiced at all, is but very imperfectly so; the steam follows the piston during the whole stroke and seems to escape, with but very slight breaks, in a continuous stream at the exhaust, without stopping long enough in the cylinders to produce the proper effect economically and well. As a natural consequence these engines do not perform regularly or run with that ease and freedom with which they should; while the steam, instead of working expansively and putting out its full force, merely impels the engine around from the actual pressure accumulated in the boiler.

Aside from the matter of injury which it is alleged high pressure steam is the cause of, to the valves and chests (and which is a matter of great doubt), from the very nature of its uncontrollable elasticity it is the most powerful motor, practical in every-day use, which is known; but to exert this power and this force, it must be legitimately and properly used. It is not so used, nor does it fulfill its true purpose when it follows the piston all the way. What is the use of a complex mechanical apparatus to regulate the force of the steam to the cylinder, if the cylinder itself is so small as to demand that the valves be opened to their fullest extent the whole day long? Under such a state of things it is but a nuisance and a stumbling block, and much better off the engine than on it. It is to the general ignorance of the manufacturers and their unwillingness to go to any expense (though they may reap the reward in a few years, at most, in the saving of fuel, of their outlay), that these matters are to be traced. It is unquestionably better to use steam expansively at 55 or 60 lbs. per square inch, at which point its elasticity and temperature are great enough for any ordinary mechanical purpose, than at a much greater pressure, non-expansively. Dr. Lardner says of expansion:—"Since the cost of producing steam as a mechanical force depends chiefly on the quantity of fuel necessary to effect the evaporation of a given quantity of water in a given time, it follows, therefore, that all the mechanical effect produced by this principle of expansion is so much power added to the steam without additional expense." Its principle is therefore obvious enough in economy of steam power. To produce the greatest mechanical effect, which forms by far the largest portion of expense required to operate steam power, many things are important, but the chief of them are in the prevention of heat from escaping from the steam during its passage from the boiler to the engine, and in employing "cut-offs," as they are termed, to operate the steam expansively; there are many of these in operation, of different forms and principles, but a great many are thrown aside and condemned simply from the fact of the pistons not having sufficient area to develop the principle properly and well; and it is a matter well worthy the attention of those applying such apparatus, that they consider most carefully whether the initial diameter of the cylinder is such as to make their inventions thorough and efficient, for, as has been mentioned, many have

been thrown aside from this cause, and both the principle of expansion and the patentee alike injured. And, as regards the radiation of heat, the other matter alluded to, and which has a most important bearing on the subject of expansion, there seems to be but little attention paid to it, if in fact there is any at all—that is, in most cases, cylinders lie naked and exposed in cold rooms, and steam pipes, unclothed, run along floors and by stone walls, without any protection whatever, and then it seems a matter of surprise to the various parties concerned that with an apparent pressure of 75 or 80 lbs. per square inch, they do not get the work demanded. It would be found, on thorough and careful management, every way better and more satisfactory to increase the cylinders and apply expansion *gear*, than to go on, day after day, in the old way—forcing the boiler and engine to the ultimate destruction of both, years before they should have given out.

William Fairbairn (than whom no more practical nor able engineer exists in England) says of forcing engines and boilers, and working non-expansively that it is "the great evil which causes all the trouble, and the gangrene which corrupts the whole mechanical system," and recent disasters and explosions tend to confirm the opinion.

It is impossible to conceive of a more economical, safe, and in every way efficient system of steam power, than the principle of working expansively; the steam escaping in tiny jets at the exhaust, rather than with a rush and roar which makes everything tremble; the fuel burns quietly away and roasts itself into ashes, instead of melting into a mass of clinker and burning out the grate bars; and the whole system moves on as harmoniously as one can conceive of. A little practical looking after the every-day, common-sense matters of the use of steam power, rather than dabbling in abstruse philosophical theories, which are of no earthly use to the manufacturer or to the mechanic until they become absolute scientific facts, would result in a more complete system than this country has ever yet enjoyed; and manufacturers would have no more cause to complain of the expense attending the use of it. And it is plain that in order to effect this much-desired end there must be some vital regeneration of the forces antagonistic to such reform. These lie not in legislation, nor yet bitter invective and much exclamation, which the daily press employs on the occasion of each disaster; the rather must we look to increased vigilance on the part of employers as a matter of absolute protection to their lives and property, and to engineers for increasing and never-tiring vigilance on their part. If, as we read, "eternal vigilance is the price of liberty," it is much more the price of safety about steam.

## PERORATION ON A WAGON BRAKE.

A case was recently argued before Judge Dunlop at Washington, on appeal from the decision of the Commissioner of Patents, involving the novelty of a wagon brake, and upon which the aspiring attorney "spread himself out" in the following eloquent style. The remarks we find reported for the venerable *Intelligencer*:—

"Now (said he) far be it from me to reflect on the action of the honorable Commissioner, for I can readily perceive the force of the reasons which he gave for declining to interfere in the matter. Nor do I wonder that those to whom he intrusts the duty of making the original and final examinations makes mistakes, but I do wonder that they make so few, knowing as I do, by practical experience, the numberless official cares and trials unseen by stranger eyes, which continually harrass, annoy, and weigh down their spirits during all the hours of the day, and which often reach and burden the mind with their leaden weight and influence even during the still and silent hours of the night. I have done; but I feel and know that into the hands of an impartial judge the interests and rights of my client are now committed, for a decision which is destined to surround the home of a meritorious inventor with all the comforts and joys which an earthly competence can afford, or to crush forever the bright anticipations which have long, and are even now, alternating between hope and fear."

No one being dead we may be permitted to add, by way of completing the picture, that, when the aurora of the morn's bright future shall dawn upon this occidental hemisphere, may it shed its refulgent beams upon a proud and happy people, whose highest anticipations of earthly bliss have been realized over all that vast expanse of territory from the rock-bound coast of Maine to the tranquil shores of the Pacific!

"The star-spangled banner, O long may it wave!"

## TESTIMONIAL LETTERS.

The accompanying letters (selected from a large number received within a few days) indicate the universal sentiment of inventors who have their business conducted through the agency connected with this publication. We might fill columns every week with such testimonials; but the few we select are sufficient to show the character of such as we omit:—

MESSRS. MUNN & CO.:—I received your note in due time, stating that my Letters Patent were ordered to issue. I assure you it was gratifying intelligence to me; and you will please accept my sincere thanks for your services in prosecuting my case before the Patent Office. I shall take great pleasure in recommending you as prompt and skillful patent agents to my friends. I have conversed with manufacturers and patentees who have done business with you, and all unite in giving you the highest praise. Respectfully yours,

B. E. ORTON.

LYNDON, Ill., March 12, 1860.

MESSRS. MUNN & CO.—Dear Sirs:—We received your letter of the 28th ult. in due time, bringing to us the gratifying intelligence that you had been successful in conducting our patent case. We received our Letters Patent on the 9th inst. We feel under obligations to you for the manner in which you have executed our drawings, and for the promptness with which you have prosecuted our case through the Patent Office; and we assure you that if we should ever make application for another patent, it shall be through the medium of your agency, and shall commend you to our friends or any who we may find desirous of procuring patents. We will also do all we can to extend the circulation of your valuable paper. We remain your obedient servants,

H. GARTNER,
J. MCCANN.

NASHPORT, Ohio, March 12, 1860.

MESSRS. MUNN & CO.:—Verily, you are not mere agents, but true and sincere *friends* to patentees and inventors. You have got granted to me more than I ever expected, or even dared to ask for. I deeply appreciate your kindness, and shall not fail to reward you handsomely in case I should make anything by my invention. Meanwhile, accept my heartfelt thanks for your generosity. I am, with sincere respect, your obedient servant,

C. PRETSCH.

TRENTON, N. J., March 15, 1860.

MESSRS. MUNN & CO.—Gentlemen:—The patent for my improved steam boiler came to hand a few days ago. I am much pleased with your promptness and success in obtaining me my Letters Patent, and shall take great pleasure in recommending you to my friends. Respectfully, your obedient servant, JOHN ARMSTRONG.

NEW ORLEANS, La., March 13, 1860.

The annexed extract is made from another letter written on other business:—"The writer of this takes this opportunity of returning his sincere thanks for the very able, prompt and efficient manner in which you have conducted his case. On the 6th inst. the patent was issued; by the end of this week our factory for manufacturing the article will be in full operation, and we have already orders on hand sufficient to keep us busy for some weeks."

## SELF-ACTING SHIPS' PUMP.

There is a great power in the waves of the sea, and several attempts have been made to apply it to work bilge pumps, but without success until now. The apparatus of J. W. Mackenzie, 65 Butler-street, Brooklyn, recently noticed in our columns as having been secured by patent, and which we have examined, appears to have peculiar merits in making a leaky ship, for example, free itself from water by its own motion. The patent covers the arrangement of chambers and valves in such relation to and in communication with a ship's hold and discharge-pipe or passages; that as the ship pitches or rolls heavily, any water which flows into her hold by reason of being sprung, shall be automatically raised therefrom and discharged into the sea. The apparatus is so arranged that it displaces no cargo. It is a fresh water tank, taking the place of a tank carrying 8,000 or 10,000 gallons of water; besides it forms a bulkhead dividing the hold into two separate compartments, on the same principle that is now coming into general use. The lower chamber of the apparatus is a well room for the ordinary pumps after it has been emptied of fresh water. It is also a ventilator, carrying off foul air from the bilges. The inventor is a practical seaman, having been for several years an officer on board of steamships, for which branch of marine he considers the invention indispensable. Many of our steamers that have gone down might have been saved or kept afloat long enough to be run ashore, brought to anchor, or until a friendly sail hove in sight to rescue the living freight.

## INDUSTRY—MANUFACTURES—COMMERCE.

*Basket Willows.*—George Rhey, in the *Gardener's Monthly*, says:—"The *Salix Russelliana* is the kind of willow generally grown around Philadelphia for osier work, and is the same as usually employed by nurserymen for tying. They are mostly grown on swampy ground, in rows 8 feet by 2. A crop (sometimes two) of hay is also cut off per annum, and enters into the calculation of profit from the plantation. The crop is not worth much till the third year, when it will produce about $15 per acre. About five or six years after planting they are in their prime, and will afford from 15 to 20 pounds from each stack, and bring prices ranging from four to five cents per pound when cleaned. The willows are cut just before the buds burst in Spring, and must be kept moist till cleaned." As several persons have made inquiries of us in regard to the peeling of willows, we answer all by saying that, by boiling them for a few minutes in a large iron boiler with water, the skin peels off easily from end to end, leaving a beautiful, smooth surface. This is the method pursued in all factories where dry willows are made into baskets. The boiling has also the effect of rendering the willows much tougher than when in the green state.

*Cotton.*—The year's crop of cotton is 4,500,000 bales, which is 671,000 more than that of last year. The prices of cotton are rather low, while those of manufactured goods are very fair; therefore, manufacturers are making large profits.

*American Copper.*—During the past year, 696 tuns of copper were shipped from the various mining districts of Lake Superior. This was an increase of 149 tuns over the product of the previous year.

*Eastern Shipbuilding.*—Increased activity is now manifested among the New England shipbuilders; and yet there never was more difficulty in obtaining paying cargoes for those vessels that are now in our ports. The keels of two new ships, of 1,000 tuns each, have lately been laid at Newburyport, Mass., and a number of small coasting vessels are on the stocks. The Maine shipyards are becoming more busy than they have been for two years past.

*Strikes of Trades.*—Quite a number of strikes have taken place recently. In addition to the great strike of the shoemakers in Massachusetts, the mechanics of Baldwin's works, in Philadelphia, have struck for 50 per cent over days' wages when they are working over-time.

*Oregon Gold.*—Further accounts from California have been received, the great feature of which are the reports from Oregon concerning the discovery of new gold mines, of vast richness, in the vicinity of Jacksonville. Marvelous stories are told of the success of some of the miners.

*Exports of Cotton Goods.*—The value of American manufactured goods exported last year, amounted to $8,316,222; in 1858, it was $5,651,504; being an increase of $2,665,718.

*Imports.*—There has been a very great increase of foreign imported goods, and many sensible merchants express fears regarding our ability to pay for them. Since the 1st of January, goods to the value of no less than $53,486,822 have arrived, which is an increase of $5,000,000 over the same period of time in 1859. Our total exports of goods in this period has only amounted to $17,098,000.

*Metal Market.*—The metal market is not very lively. The price of foreign pig iron has advanced from $24 to $25.50 and $27. This is owing to the strike among the Scotch iron-makers.

*Breadstuffs.*—The best qualities of flour are in very good demand, and range from $7.50 to $8. The poorer grades are very dull of sale.

## THE PROFITS OF TANNING.

The leather-dealers of this city, in their recent circular on the depressed condition of the trade and manufacture, give the following estimate of the profits of tanning. It would not seem to be a very disastrous business. They take 10,000 hides as a basis; a greater or less quantity will give the same result:—

| | |
|---|---|
| 10,000 hides, average say 22 lbs., 220,000 lbs., say cost 22c. | $48,400 00 |
| Add 5 per commission for buying | 2,420 00 |
| Loss of interest on value of hides, say 7 per cent | 3,388 00 |
| Cost of hides, commission and interest | $54,208 00 |
| 220,000 lbs. hides, with gain 60 per cent—352,000 lbs., at 21 cents | 73,920 00 |
| Deduct 6 per cent for selling leather | 4,435 20 |
| Net proceeds | $69,484 80 |
| Deduct for hides, commission and interest | 54,208 00 |
| Leaves tanner for tanning | $15,276 80 |

## FOREIGN NEWS AND MARKETS.

*The Steam Plow.*—Mr. J. C. Williams, of Baydon, Wiltshire (England), recently lectured before the Hungerford Farmers' Club, and spoke in glowing terms of "Fawkes' American Steam Plow." He blamed British farmers for being so dilatory in adopting steam plows, when it had been so satisfactorily demonstrated that they were far more economical than horses. In all England only one hundred farmers have as yet adopted then, whereas all who cultivate 400 acres of land should now be using them.

*An Independent Mechanic.*—The Dundee (Scotland), *Advertiser* states that, at a recent meeting in Forres, to devise means for relieving the distress of the laboring population of the district, Mr. Stuart, cabinet-maker, recommended, in an emphatic manner, that money should only be given in exchange for labor. "I know the class," he said; "they are a proud-spirited, although at present a suffering class, and will do anything rather than be made beggars of. I'm as poor a man's among them, but dash my skin if can stand beggary." (Applause and laughter). This hint seems to have been acted upon. That's the talk!

*Railroad Reform.*—English locomotives, until quite recently were built without a house or cover for the engineer, but a reform in this line has commenced. Two new engines with houses like those on American locomotives have just been placed on the Stockton and Darlington line.

*Lime Lights.*—Two great Drummond lights have been put up at the ferry landings in Liverpool; they are said to illumine a large space with a brilliancy equal to the light of day.

*Sheffield Steel.*—There is a very good business doing in steel, for American orders, at Sheffield.

## WEEKLY SUMMARY OF INVENTIONS.

### STEREOSCOPIC CASES.

This invention relates to several valuable improvements in those neat and entertaining cases, whereby the arrangement of a number of pictures in the same case and the proper exhibition of the same is greatly simplified, and the cost of the whole case considerably reduced. The picture-holders consist simply of wooden bars and spring clasps in which one or two pictures can be inserted as desired. The pictures can be changed and adjusted quite readily, and the picture-holders are fastened to one or more bands, the ends of which are screwed to a rotary shaft in such a manner that one of the picture-holders after the other is brought before the eye-glasses. Glass pictures can be exhibited as well as paper pictures, and the pictures are always in good order, and can easily be changed. The inventors Messrs. Sealey & Lea, of 127 Elm-street, this city, keep constantly on hand a supply of these improved cases. They obtained a patent for this improvement last week, through the Scientific American Patent Agency.

### GAS RETORT.

This invention consists in the combination with a horizontal cylindrical retort, having near one end an opening in the top for the introduction of coal or other solid material from which gas is to be obtained, and an opening in the bottom for the discharge of the coke or other residuum, of a screw fitted to the interior of the retort with a stem or head projecting through one end of the retort to enable it to be turned for the purpose of moving the charge towards the opposite end of the retort to where it is introduced and of drawing out the residuum. The credit of this contrivance is due to R. E. Harrington, of Newark, N. J.

### HAY AND COTTON PRESS.

This invention consists in combining with an open head press box of a suitable size and strength, to resist lateral pressure, two movable followers, having a simultaneous movement to or from each other, which is to be imparted to them by an arrangement of ropes or chains, that are wound up in opposite directions on a shaft which is operated by a worm screw and wheel and suitable cranks or levers connected therewith; the worm screw is to be arranged in such a manner with relation to its wheel that it can be disengaged from the wheel for drawing apart the followers after each operation of the press; the whole, when combined, forms a light, simple, cheap, and efficient power press, requiring to be braced only against lateral thrust. The inventor of this improvement is David L. Miller, of Madison, N. J.

### FIRE-PROOF SAFE.

This invention and improvement in the construction of fire-proof safes, consists in interposing between the inner and outer metallic walls of the safe, a sheet or sheets of metallic plaster-holding plates, which are swaged into alternating dove-tail elevations and depressions, so that when the filling of any antiphlogistic compound is put in, on both sides of this central wall, and allowed to *set* or dry, it will be attached firmly to the wall and will not detach itself from it by shrinking or settling as is the case with fire-proof safes of the present construction. This improvement was designed by John B. Cornell, of 143 Center-street, this city.

### GRINDING MILL.

This invention relates to certain new and useful improvements in that class of grinding mills in which metal grinders are employed. The object of the invention is to obviate the difficulty hitherto attending the proper adjustment of the stationary grinder as well as to compensate for any inequality of surface attending an unequal shrinkage of the grinders in casting, also the obviating of injury to the grinding surfaces by casual contact when the mill is empty, and the feeding of the substances to be ground to the grinders with a speed proportional to the velocity of the running grinder, so that the feed will always be commensurate with the grinding capacity, whether the same be great or small. This device has been patented to William Stewart, of Philadelphia, Pa.

### FURNACE.

The object of this invention is to employ gas or vapor of some volatile and combustible substance for the purpose of heating crucibles in a small portable furnace. The blaze of the combustible gas or vapor together with the necessary amount of oxygen is forced into the furnace and made to pass around the crucible, heating the same very effectually and with little expense. This furnace is particularly applicable to melt small quantities of gold or silver, and in places where gas is used, it will be found of great convenience. The inventor of the furnace, J. B. Marvin, of No. 91 Elizabeth-street, this city, obtained a patent for the same through the Scientific American Patent Agency. He manufactures these furnaces, and will be happy to give further information on the subject on being addressed as above.

### CONTRIVANCE FOR LIFTING LADIES' DRESSES.

This invention consists in a novel system of cords, weights, stops and guides, combined with a waist-band, or its equivalent, to be worn inside of aladies' outer garment, for the purpose of enabling her to lift the skirts thereof all round, or in front or behind only, just as high as and no higher than she may desire, and to hold it up for the purpose of keeping it out of the dirt. William E. Stein, of this city, is the inventor.

### AIR-HEATING FURNACE.

This invention relates to an improved air-heating furnace in which steam is employed as a heating medium. The invention consists in a novel arrangement of a fire-chamber, boiler, steam pipes and steam-chamber, placed within an air-heating chamber, and used in connection with a draught regulator and safety attachment, whereby a very simple, economical and safe steam air-heating furnace is obtained. The credit of this contrivance is due to Richard T. Crane, of Chicago, Ill.

### GAS STOVE.

This invention consists in a certain novel construction and arrangement of the burner or grate, the heating surfaces, and the air passages of a gas stove for heating air for warming apartments or buildings, whereby a very copious supply of heated air, pure and uncontaminated by the products of combustion, is obtained with great economy of gas. The inventor of this improvement is E. A. Leland, of Jacksonville, Ill.

### SAW.

This invention consists in having the saw provided with adjustable teeth, and portions of the under sides of the same and edge of the saw provided with a flanch of a width nearly equal to the cutting edges of the teeth, whereby the sawdust is discharged from the kerf and the choking of the saw and consequent heating of the same is avoided. This improvement was designed by James E. Emerson, of San Francisco, Cal.

### FURNACE.

The object of this invention is to obtain a very simple furnace, that will be capable of being used as a boiler and evaporator in the manufacture of sugar and for other purposes. One that may be adapted to operations on a large scale and well arranged for the controlling of the heat, and the ready manipulation of the parts for that end. This device has been patented to B. D. Evans, of Mount Vernon, Ohio.


ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MARCH 20, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

27,507.—Stephen M. Allen, of Niagara Falls, N. Y., for an Improvement in the Treatment of Fibrous Plants:

I claim my new mode of treating fibrous materials, such as flax, hemp, jute, manilla, grass, sugar cane, &c.; the same consisting in subjecting them to the action of air charged or saturated with moisture or vapor, substantially as set forth.

27,508.—John Ashcroft, of Lynn, Mass., for an Improvement in Low Water Safety Apparatus for Steam Boilers:

I claim a fusible tube, D, or its equivalent, arranged in a pipe communicating with the boiler, as set forth for the purpose described.

26,509.—N. L. Babcock, of New Haven, Conn., for an Improvement in Breech-loading Fire arms:

I claim the combination and arrangement of the spring catch and hammer, whereby the detent, E, is securely held in place and forced home by the hammer, C, when constructed substantially in the manner and for the purposes specified.

27,510.—Geo. Bailey, of Buffalo, N. Y., for an Improvement in Printing Railroad Tickets:

I claim the printing of coupon tickets for railroads and other lines of travel, and numbering said tickets with their coupons in successive order or series, by one operation of the press, by means of an arrangement of a chase to hold the types for the ticket and its coupons and sets of numbering wheels corresponding to the ticket and coupons upon one press, operating so as to imprint the ticket upon a fillet of paper, properly fed along to receive said printing, as set forth.

I also claim the mechanism for feeding the paper under the types, in such manner as to perform likewise the operation of perforating or partially separating the coupons from each other and from the ticket, so as to be readily torn apart at the place of such perfortions, consisting of two rollers or cylinders, one of which is plain and the other armed with a series of rings having teeth upon them which press upon or pass into the other or plain roller, so that the points of the rings will cut through or perforate the paper and thus, by the act of perforation, secure the necessary grip to feed the paper, as described.

27,511.—E. Ball and M. L. Ballard (assignors to E. Ball), of Canton, Ohio, for an Improvement in Harvesters:

We claim the combination and arrangement of an adjustable steel spring cap plate with the heel of the cutter bar and the shoe which supports the heel of the finger bar, substantially as described and as shown in Figs. 1 and 2, of the drawings.

27,512.—James H. Banta, of Piermont, N. Y., for an Improvement in Joint Chairs for Railroads:

I claim the block, c, formed with the projection, 4, taking beneath the key, d, and the flange, 3, setting over the part, 6, of the chain, b, the whole constructed and acting substantially as set forth.

27,513.—A. C. Barstow, of Providence, R. I., for an Improvement in Cooking Stoves:

I claim the double plate extending from the bottom to the top plate and throughout the width of the stove, forming a partition chamber so arranged as to separate the fire-chamber from the flues, when said plate or chamber is provided at the top, or thereabouts, with apertures or openings respectively for the admission to, and egress from, said chamber of external air, whereby a continuous and rapid circulation of fresh air is necessarily created and maintained through and by the heat of the chamber, for the purposes herein specified, in combination with the flue passages near the top and at either end of said partition chamber, by which three or more boiler apertures can be used on the front of a stove and over a comparatively small fire, and the heat be applied equally to each, and by which also when the heat has passed from the fire-chamber it is first applied to the ends of the oven where it is most needed.

27,514.—E. Bates, Jacob Weist, and Michael Weist, of York, Pa., for an Improvement in Shoemakers' Floats:

We claim the combination of the curved dog, D, with the float or rasp, E, springs, C C, and rod, A, when arranged and constructed as and for the purpose shown and described.

[This invention relates to an improvement in the tool used by shoemakers for rasping off the ends of projecting pegs inside of boots and shoes, and which tool is technically termed a float. The invention consists in a peculiar means employed for admitting of the self-adjustment of the float and handle, and, at the same time, holding the float sufficiently firm in any position relatively with the handle that may be required in using the tool.]

27,515.—Robert Beans, of Johnsville, Pa., for an Improvement in Guard Fingers for Harvesters:

I claim forming the guard with curved wings, D, extending on each side to serve as braces, and forming a crotch in their rear above the body or depressed portion of the finger, leaving a space between the rear of the wings and the front of the cutter bar and the open spaces, $d^2$, on each side of the finger; the whole arranged to operate as described for the purpose set forth.

27,516.—John Bestwick, Jr., and Abner Alden, of Dedham, Mass., for an Improvement in Car Couplings:

We claim the combination of the rotating rubber cylinders, C and $C^1$, for directing and controlling link, D, substantially as described.

27,517.—A. J. Bell, of Greenupsburgh, Ky., for an Improvement in the Arms of Carriage Axles:

I claim, in the construction of an ordinary compound truss axle, A B C, making each of the arms thereof in two parts, a, b, and with an oil space, i, one of said parts being placed edgewise, vertically, and the other flatwise, horizontally, and both united together by a collar, h, and screw nut, j, substantially as and for the purposes set forth.

27,518.—Wm. H. Bell, of Washington, D. C., for an Improvement in Revolving Fire-arms:

I claim, first, The use of a hollow axial stem, D, furnished with a discharging device, E, in combination with a revolving fire-arm, substantially as and for the purposes set forth.

Second, The employment of a spring device, $J^2$, in combination with a guide box, K, for holding the primer securely in line with the nipples after it is elevated by the slide, and guarding it until the hammer explodes it, substantially as and for the purposes set forth.

Third, The combination of the barrel stop or dog, n, with the cock,

I, by means of a spring hook-shaped extension, G, of the primer-lifting slide, G, substantially as and for the purposes set forth.

Fourth, The combination of a sliding pin, L, with the series of primers and with the cock, J, substantially as and for the purposes set forth.

Fifth, The combination of a cam, N, with the sliding pin, L, substantially as and for the purposes set forth

### 27,519.—Dixon Brown, of Norfolk, Va., for an Improved Pin Fastening:

I claim the pin, B, attached directly to the plate, A, and coiled at its junction therewith, to form a spring, a, in connection with the claw, C, substantially as and for the purpose set forth.

[This invention consists in attaching the pin directly to the plate, and having the pin coiled at its junction with the plate to form a spring which will have a tendency to keep the point of the pin towards the plate, and using in connection with the pin thus coiled, a claw or pointed prongs which are attached to the plate and placed in such relation with the pin that the same cannot be casually detached from the article to which it is applied.]

### 27,520.—J. D. Burdick, of Newbern, N. C., for an Improvement in Operating the Slats of Window Blinds:

I claim the lever, D, constructed as described and represented, spring, G, and vibrating connecting rod, F; all arranged and combined, forming a new article of manufacture.

[This invention consists of a lever or pivoted handle provided with a pressure spring, acting against a square or polygonal surface on the end of the lever, so that when the two parts are suitably connected to the slat bar, the slats will be locked in their two extreme positions, and at any intermediate point to which they may be set they will remain in a fixed state.]

### 27,521.—Sarah D. Carman, of Middletown, N. Y., for an Improved Reclining Chair:

I claim attaching the back of a chair, sofa, or other seat, to its seat by means of a hinge or joint, C, one or more, formed of two curved concentric bars, a, b, attached respectively to the seat and back, and with each other, substantially as and for the purpose set forth.

[This invention consists in a peculiar manner of attaching the back to the seat, whereby the back is rendered susceptible of two different adjustmens relatively with the seat; and the back thereby rendered capable of being secured in a more or less inclined position, and also further forward or backward on the seat so as to increase or diminish the depth of the same, as the convenience of the occupant may require.]

### 27,522.—Wm. S. Carr, of New York City, for an Improvement in Valves for Water-closets:

I claim, first, The independent cup leather valve, i, controlled in its motion by a cylinder having a water leakage and closing against the end of a cylindrical passage between the supply and discharge pipe, substantially as set forth.

Second, I claim a slot, x, in a cylinder containing a cup leather or plunger, for the purpose of allowing water to pass gradually from one side of said cup leather or plunger to the other, to regulate the gradual closing of a valve in water-closets, as specified.

Third, I claim closing the water passage in the valve before opening the induction valve so that there is no leakage or waste of water consequent upon the use of two valves acting successively in opposite directions, and neither of which may be upon their respective seats, as set forth.

Fourth, I claim a cylindrical passage or water-way, f, between the supply and discharge pipes combined with an elastic washer or plunger, q, that is forced into said water-way, and acts on the valve, i, substantially as specified.

### 27,523.—Vosco M. Chafee, of Xenia, Ohio, for an Improvement in Mowing and Reaping Machines:

I claim arranging the platform on the frame in the manner I have described, and hanging it upon the center or axle of the driving wheel, J, and a corresponding center, m, in the frame, by means of the arms, T, and m, and in making the arm, T, a part of the center piece, F, wherein one end of the shaft, b, has its journal, so that the arm, T, the shaft, b, and the platform, H, shall all vibrate together about the same center, and these I claim only when the whole is arranged substantially as described.

### 27,524.—James Clark, of Baltimore, Md., for an Improvement in Sealing Locks for Railroad Cars:

I claim, as a new article of manufacture, the perforated stud, c, rising from the lock plate, as described when employed with a swing latch and wire, for sealing the lock; the whole constructed as specified.

### 27,525.—Lucius H. Colby, of Groton, N. Y., for an Improvement in Wagon Jacks:

I claim, first, The described hook and slide for the purpose of holding the lever in its place at any desirable position or altitude, when raising the wagon wheel off the ground.

Second, I claim the so making the hook shaped prawl that it shall clamp the rod by its leverage on the rod or slide and further its turning on the said rod, for the purpose of suiting the lever when in either series of holes in the plate, as described.

Third, I claim the combination as a whole, when composed of the standard, the plate with double series of holes, the lever, the slide or rod, the hooked prawl, clamping by its leverage at any point on the rod or slide by the action of the said lever, when the said combination is made and operated as described.

### 27,526.—J. Maslin Cooper, of Pittsburgh, Pa., for an Improvement in Revolving Fire-arms:

I claim, first, So constructing and arranging the lock and revolving cylinders of revolving breech fire-arms substantially in the manner hereinbefore set forth, as that the same fire-arm may be equally well used either with a cylinder open at both ends and carrying fixed ammunition charged at the rear, or with a cylinder constructed so as to load from the front, and carry loose ammunition, or ordinary powder and ball.

Second, The mode hereinbefore described of rendering revolving breech fire-arms susceptible of firing either fixed ammunition loaded from the rear, or powder and ball charged into the front end of the breech, by the use with a single fire-arm of two or more cylinders of different constructions to suit the different kinds of charge, so arranged in combination with the lock barrel of the fire-arm as that either may be used at pleasure.

### 27,527.—John B. Cornell, of New York City, for an Improvement in Safes:

I claim forming the interior fire-proof wall of safes by interposing between the two layers of plaster the continuous metallic plate, A, or any other suitable plate possessing the retaining shape for the purposes and essentially as described.

### 27,528.—J. B. Cornell, of New York City, for an Improved Double Cylinder Fire-proof Column:

I claim constructing an architectural column of two concentrically arranged cast iron tubes and an intermediate solid mass of fire-proof composition when the said parts are combined with each other in such a manner as to form but a single article of manufacture which shall possess the characteristics set forth.

### 27,529.—John Q. Cowell, of Vernon, Ind., for an Improvement in Apparatus for Tanning:

I claim the arrangement of the vats and troughs to each other as set forth when said vats are provided with an angular space separated from the basin of said vats by partitions, as set forth.

### 27,530.—Richard T. Crane, of Chicago, Ill., for an Improvement in Air-heating Furnaces:

I claim, first, The combination with an air-chamber, A, and fire-chamber, B, of the boiler, C, tubes, F, and steam chamber, G, substantially in the manner and for the purposes described.

Second, The combination with the fire-chamber, B, steam boiler, C, tubes, F, and steam chamber, G, of the draft-regulating and fire-extinguishing devices described, substantially as and for the purposes set forth.

### 27,531.—S. Daggett, of Charleston, S. C., for an Improvement in Car Couplings:

I claim the arrangement of the hinged hollow chamber, D, with the rolling weight, F, and buffer arm, E, in combination with the pin, B, and shell, A, constructed and operating substantially as and for the purpose specified.

[This coupling is self-locking, as the action of the shackle causes the rolling weight to change its position from the rear to the front end of the chamber in which it is enclosed, and by the motion of the chamber the working pin is pushed up and made to pass through the shackle. The weight in the front end of the chamber prevents said pin changing its position spontaneously, and by raising the front end of the chamber the shackle can be released at any moment.]

### 27,532.—Florimond Datichy, of Paris, France, for an Improved Apparatus for Re-working the Waste Steam of Steam Engines:

I claim, first, The method herein described of utilizing or re-working the exhaust steam or other escaping gas or vapor of an engine by subjecting it, first, to a partial condensation and afterwards applying heat to evaporate its liquified products, and then injecting it, after its temperature and elasticity have been increased, in the form of steam or vapor, into the boiler for use over again, as specified.

Second, The employment of separate reservoirs maintained at different temperatures, to receive successively the exhaust steam, gas, or vapor of the engine, and operating, first, to partially condense the steam and afterwards to evaporate its liquified products and to increase its temperature and elasticity, prior to its return to the boiler, there to be re-worked, essentially as set forth.

Third, The employment, in combination with the exhaust steam receiving reservoir or reservoirs above named, of a worm or coil of pipes or other suitable heater, arranged in close proximity to the boiler furnace, for increasing the tension of the exhaust steam prior to its return in a vaporous form to the boiler substantially as specified.

Fourth, Passing the exhaust steam in a vaporous form from its receiving chamber or reservoir to the worm or heater, by means of pumps or their equivalents, essentially as described.

Fifth, Causing a jet of steam from the boiler, or of working presure to be injected into the worm or heater, to raise the tension of the exhaust steam and to drive it into the boiler and control the suction of the pumps employed in supplying the heater and with exhaust steam.

### 27,533.—Alexander Dean, of Richmond, Ind., for an Improved Washing Machine:

I claim, first, The combination of the vibrating disk or brush, C, with the vibrating tub, B, and brush, or the equivalents to D, herein described; the whole being arranged in a manner substantially as described.

Second, The combination of the lever, E, and links, F G, with the brush, C, tub, B, and disk, D, substantially as shown.

### 27,534.—Caleb W. Dyer and D. M. Cummings, of Enfield, N. H., for an Improved Shingle Machine:

We claim, first, bringing one corner of a block of wood in contact with the teeth of a circular saw, and then imparting such a character of feeding movement to the said block as will enable the saw to cut its way through to the diagonal corner of the same, and in such a manner that the kerf lines on the main portion of one side of each shingle thus formed will be nearly parallel with the grain of the wood, all substantially as set forth.

Second, We also claim the combination of the carriage, F', and the block-holder, F, with each other and with the laterally movable plate, G, the longitudinally movable plate, O, the bearers, N N', and the stop plates, a a', substantially in the manner and for the purpose set forth.

Third, We also claim the undogging of the shingle block at the proper moment of time, and then dogging it again in a different position within the block-holder, in the manner set forth.

Fourth, We also claim our improved method of imparting the forward and rearward movements to the carriage, F, viz., by means of the cams, j k, on the face of the cam wheel, U, which operate through the medium of the reciprocating sliding plate, W', the vibrating lever, W, and the auxiliary devices which are combined with the said parts, substantially in the manner set forth.

Fifth, We also claim the peculiar arrangement of the parts for transmitting different degrees of motion from the saw shaft, I, to the horizontal shaft, S', viz., the broad bevel-faced friction wheel, I', on the saw shaft, being secured thereto in such a manner that it is compelled to rotate therewith at the same time that it can be moved up and down the same, whilst the narrower bevel-faced friction wheel, S', is rigidly secured to the inner end of the shaft, S, and the journals of said shaft are of such a length that it can be moved lengthwise to any desired extent by means of the hand lever, K, or the equivalent thereof, substantially in the manner set forth.

### 27,535.—John Ebner, of Lancaster, Pa., for an Improved Shutter Operator:

I claim the push and pull bolt, with its joints, A B C, and sliding box, D, pivot, Y, on the plate, Z, attached to the shutter; the weighted bolt, K, operated on a pivot by a rod, with its hook, M; and the double beaked tilter, G and H, on the rod, P, the stay plates, F, when combined substantially as set forth for the purpose specified.

### 27,536.—Pearson Embree, of West Chester, Pa., for an Improved Churn:

I claim the employment, in a churn, of a series of slats or projections attached to the inner surface, and so arranged that each row shall point obliquely in the line of motion of the churn, and the slats in each successive row point in opposite directions, substantially as described.

### 27,537.—James E. Emerson, of San Francisco, Cal., for an Improvement in Saws:

I claim the adjustable teeth, B, in combination with the flanches, C, formed on the inner sides of the teeth, and on the edge of the saw plate, substantially as and for the purpose set forth.

### 27,538.—Wm. Emmett, of Galveston, Texas, for an Improvement in Machines for Polishing Marble:

I claim, first, The arrangement of the rubbing surface, F K or I, in combination with the sand-box, E, water-box, G, and shifting box, A, or their equivalents, substantially as and for the purpose described.

Second, The employment of the rollers, F F', or their equivalents, arranged for operation substantially as described, for the purpose of rubbing fluted columns.

[The object of this invention is to facilitate the operation of smoothing, rubbing and polishing the surface of articles of stone, marble, &c. A perforated or slatted rubbing or polishing surface to correspond to the surface to be polished is connected with a shifting box and with a water reservoir in such a manner that a continuous supply of sand and water, in the required quantities, to the surface to be rubbed or polished is effected. Different rubbing or polishing surfaces can be attached to the same shifting box and water reservoir. The rubbing surface used for polishing fluted columns is so arranged that it adjusts itself to columns of different diameter.]

### 27,539.—James Henry Burton, of Jefferson county, Va., for an Improvement in the Manufacture of Gun Barrels. Patented in England Sept. 29, 1859:

I claim the making of gun barrels by drawing them down from a cylinder between grooved rolls and over graduated mandrels, so that they shall not only be reduced in diameter and in the size of the bore at each successive pass, but also tapered externally, substantially as set forth.

### 27,540.—Geo. A. Engelhard, of New York City, for an Improvement in Varnishes:

I claim the use and application of the solution in question as a varnish suitable for wood, plaster-of-paris, paper, photographs, ambrotypes, and as a varnish upon new metallic substances.

### 27,541.—Benj. D. Evans, of Mount Vernon, Ohio, for an Improvement in Furnaces:

I claim, first, The combination of the furnace, A, and its attachment, D, provided with the cold air-chambers, b g, and arranged to operate as and for the purpose set forth.

Second, The combination of the register, B, furnace, A, attachment, D, cold air-chambers, b g, flue, E, dampers, j F, and boiler, B', when arranged as shown, so that the above-named parts may be used jointly, and also admit of the furnace, A, being readily detached and used separately.

### 27,542.—H. P. Gengembre, of Allegheny, Pa., for an Improvement in Apparatuses for the Distillation of Coal:

I claim, first, A cylindrical or polygonal retort, having, at the center of both ends, a hollow journal or tube, and being susceptible of receiving a continual or occasional movement of rotation or oscillation around its own axis, for the purpose specified.

Second, The construction and arrangement of the pillow blocks or of the friction wheels, as described, when used for the purpose of causing the motion of the retort itself to make the substance under treatment travel from one end to the other of the retort, and said retort charge and discharge itself automatically.

Third, The charging box, constructed and operated as described, in combination with the retort, and for the purpose specified.

Fourth, The discharging tube, when used in combination with the hollow journal of a movable retort, as described, for the purpose specified.

Fifth, The gas pump fan or exhauster, the pipe, V, the tube, H, and the pipe, f, as described, when forming part of a close circuitous conduct for returning over and over the permanent gases in the retort, substantially as specified.

### 27,543.—Richard E. Harrington, of Newark, N. J., for an Improvement in Gas Retorts:

I claim the employment of a screw, R, fitted to the cylindrical retort, substantially as described, in combination with openings, C D, provided at the top and bottom of the retort, near the same end thereof, as described, for the purpose of arranging or distributing the charge and withdrawing the residuum.

### 27,544.—Mark Howland, of Waterbury, Conn., for an Improvement in Adjustable Stops for Window Frames:

I claim the nuts, d, fitted in the stiles, c, of the window casing, the screws, F, the slotted plates, a, in the stops, D, and the washers, E, to form fastenings for securing stops to window casings, substantially as described.

[The strips or "stops," as they are technically termed, which are secured to the inner ribs of the stiles or jambs of a window casing for the purpose of retaining the lower sash in proper position, are, as is well known, attached to the stiles or jambs by small nails in order that they may be readily detached from the casing to permit of the removal of the sashes for the purpose of glazing, cleaning, painting, &c. This mode of attaching the "stops" to the casing does not admit of any adjustment whereby the stop may be snugly fitted against the sash to compensate for shrinkage, and also to form a tight fit for winter or cold weather; and, in consequence of frequent withdrawing and driving in of the nails, the paint is disfigured and the stops often broken. The object of this invention is to obviate these difficulties, and to this end screws are employed which pass through washers, slotted plates in the stops, and into female screws or nuts which are screwed into the stiles or jambs of the casing.]

### 27,545.—James Ingram, of New York City, for an Improvement in Fitting Sinks:

I claim a plate, a, attached directly to the wall, or other support, when the pipe or pipes, air vessel or air vessels, are cast in such plate, and the water pipes connected to the thimbles, I I, or their equivalents, as specified, and for the purposes set forth.

I also claim the arrangement of the flanges, 4 and 5, for sustaining the sink and shedding off any water that may splash up on to the plate, a, when such flanges are formed on the said plate as specified.

### 27,546.—Abram H. Jones, of Fallsington, Pa., for an Improvement in Sewing Machines:

I claim the reciprocating slide, L, its permanent projection, n, and the movable bent arm, p, in combination with and arranged in respect to the double-pointed shuttle, a, and for the purpose set forth.

### 27,547.—John H. Kaufman, of Lisburn, Pa., for an Improvement in Railroad Cars:

I claim the combination with the car body, D, and platforms, A, of the racks, F, pinions and shafts, G H, and springs, I, substantially as and for the purpose shown and described.

[This invention consists in having the bodies of the cars fitted between ways or guides on the platforms of the trucks, and having racks on the under surfaces of the bottom of the cars, the racks gearing in pinions attached to shafts on the platforms of the trucks, rim shafts being connected to springs, or their equivalents, on the platforms, as is shown.]

### 27,548.—Levi S. Lapham, of Providence, R. I., for an Improvement in Lubricators:

I claim the combination with the cylinder, A, pump cylinder, D, and piston, F, of the annular oil passage, k, and annular valve, j, perforated in the center, as shown, so that, when the piston is withdrawn, the valve, j, will rise and the oil will enter the cylinder, D; and when the piston is pushed down, the valve, j, will close the passage, K, and the oil will pass through the center of the valve, j, to the machine to be lubricated, all as set forth.

[The object of this invention is to combine an oil chamber and pump in such a manner that the same may be applied to a steam cylinder and oil injected into the cylinder, or into parts connected therewith, by the simple action of the plunger only, thereby avoiding the manipulation hitherto required to supply the pump cylinder with oil previous to the injection of the same into the cylinder.]

### 27,549.—Phineas Leach, of Lewiston, Maine, for an Improvement in Weather Strips for Doors, &c.:

I claim a door strip made of rubber, or other elastic material, having a semi-circular part, a, with a flange, b, upon either side, as shown and described.

[This invention constitutes an improved and highly useful article of manufacture, which is intended to be produced and sold by the yard measure. The strip being provided with flanges, is readily fastened to the tops, bottoms and sides of doors or windows, and it can be used without the employment of grooves or cleets.]

### 27,550.—Wm. T. Leach, of East Wareham, Mass., for an Improved Forging Machine:

I claim the combination of the arm, d, of the hammer hub, the mortised stud, G, and the mortised arm, I, of the hammer rock-shaft, the whole applied and operating together substantially as set forth.

[This invention relates more particularly to the machinery which constitutes the subject matter of Letters Patent granted to Samuel J. Seely, dated Aug. 4, 1857, and consists in an improved mode of applying the hammers, in combination with their rockshafts, for the purpose of preventing the breakage of the hammer arms, or other connection of the rockshafts.]

### 27,551.—C. V. Littlepage, of Austin, Texas, for an Improvement in Millstone Dress:

I claim the millstone dress shown and described, when made and laid out in the manner set forth, for the purpose specified.

[The object of this invention is to obtain a millstone dress that will cause the grain to be rapidly ground without heating the same. The

invention consists in the employment or use of curved furrows laid out or draughted on the face of the stave in a peculiar way, whereby the grain will be cut or reduced to a pulverulent state by a cutting action, instead of the excessive grinding action as hitherto, and the desired end thereby attained.]

27,552.—John B. Marvin, of New York City, for an Improved Portable Furnace:

I claim the combination with a furnace, A, of a blaze pipe, D, and a wind pipe, E, constructed and operating substantially in the manner and for the purpose specified.

27,553.—Thos. J. Mayall, of Roxbury, Mass., for an Improvement in Hose Tubing:

I claim a hose or tubing formed of two or more concentric, woven seamless tubes, composed of flax, cotton, or other fibrous materials, one over the other, the innermost one having a lining formed either wholly or in part of india-rubber or gutta-percha, as set forth.

27,554.—Edward Maynard, of Brooklyn, N. Y., for an Improved Tassel for Window Curtains, &c.:

I claim, as a new article of manufacture, the tassel mold, covered in the manner specified.

27,555.—Geo. McKown, of Altona, Ill., for an Improvement in Upsetting Tires:

I claim the stationary plate, H, provided with an eccentric toothed jaw, b, and a lip, f, in connection with a movable or sliding plate, D, provided with a cap plate, a', having an eccentric jaw, e, and lip, f, and operated by the toggles, E E, and screw rod, F, substantially as and for the purpose set forth.

I further claim, in connection with the stationary and the sliding plate and operating mechanism above-named, the punch, J, and bolster, K, applied to the plates, as and for the purpose set forth.

[The object of this invention is to obtain a simple device for upsetting, contracting and punching tires for wheels, so that the former may be readily made to fit and be secured to the latter without being cut and re-welded.]

27,556.—David L. Miller, of Madison, N. J., for an Improvement in Hay and Cotton Presses:

I claim the combination with the press box, A, of the two followers, E E', with their stripping bars, G G'', rollers, b b, and hooks, c c, pulleys, d d, working loose on their shafts, I, shaft, K, and worm wheel and worm shaft, N P, the latter being hung in a pivoted bracket and operated as set forth, when these several parts are all arranged as and for the purposes described and represented.

27,557.—John Miller, of Saltpeter, Ohio, for an Improvement in Water Wheels:

I claim the pivoted valves, B, in connection with the conductors, E E, in the manner and for the purpose described.

27,558.—Geo. W. Morgan, of Prattsburgh, N. Y., for an Improved Self-acting Wagon Brake:

I claim the arrangement of the clasp, c, and brake bar, A, substantially as described, for the purpose of operating the brake levers, as set forth.

27,559.—Wm. Morgan, of Middlebrook, Va., for an Improved Churn:

I claim the combination of the inclined perforated dashers or beaters, b, and the removable perforated breakers, a', with the sliding frame, D, when arranged for joint operation as described, for the purpose set forth.

27,560.—Solomon Moyer, of Shimersville, Pa., for an Improved Machine for Bending Felloes:

I claim the sliding mold rest, D, when operated as described, in combination with the tightening clamp, O, thumbscrew, 2, and lever, V, in connection with the cranks, 1 1, for operating the half nuts, 7 7, when constructed as and used for the purpose set forth.

27,561.—John S. Nolen and Charles C. Hinchman, of Paulsboro', N. J., for an Improvement in Boot-crimping Machines:

We claim the follower, G, springs, J J, with adjustable jaws, B D, and former, H, when the same are arranged and combined essentially as and for the purpose set forth.

[The nature of this invention consists in giving elasticity to the follower which is interposed between two jaws, for the purpose of facilitating the removal of the finished boot front, and so that it will adapt itself to the convex surface of the former when said former is forcibly brought down upon it with the leather attached thereto, thereby preventing any uneven strain on the leather, and so that the work will be smoothly crimped.]

27,562.—Francis Odell, of New York City, for an Improvement in Attaching Thills to Vehicles:

I claim the key, D, or equivalent, in combination with the head, C, on the end of the thill iron, and jack, F, having a socket formation on its outer end, as described, for the purpose of forming a coupling for attaching thills to axles, substantially as set forth.

27,563.—Clark D. Page, of Rochester, N. Y., for an Improved Composition for Artificial Stone:

I claim the manufacture of an artificial "Glauconitic Building Stone," in the above-stated manner, of glauconitic earth or loam, such as is found in the cretaceous and some other geological formations, with the admixture of either cement or sulphate or hydrate of lime, substantially as described.

27,564.—J. B. Palser and G. Howland, of Fort Edward, N. Y., for an Improvement in the Preparation of Straw for Paper Pulp:

We claim, as an improved article of manufacture, the "staple fiber," substantially as set forth.

27,565.—John G. Perry, of South Kingston, R. I., for an Improved Machine for Filling Sausages:

I claim the combination of the gear wheel or roller, C, and the wheel, D, with the pipe, G, substantially as and for the purposes described.

27,566.—Reuben Rolph, of Coventry, N. Y., for an Improvement in Trace Safety-bars for Vehicles:

I claim, first, The construction and arrangement of the metallic plate and longitudinal rod across the thills, the upright posts and rollers, between which continuous or connected traces are hitched, so as to render, laterally, the arrangement of the lever and sliding bolt to hold the traces in position for draft, and admit of them being detached instantly, all in combination as specified, for the purposes set forth.

Second, I claim, as a modification of the above, the double connected vibrators for hitching traces to vehicles, as described, for the purposes set forth and specified.

27,567.—Wm. Richards, of Barcelona, Spain, for an Improvement in Wet Gas Meters:

I claim the adaptation and combination of means in water gas meters, whereby the more accurate admeasurement of gas may be obtained, substantially as explained.

27,568.—Artemus Rogers, of Painesville, Ohio, for an Improved Machine for Bending Wood:

I claim the employment of a pair of vibrating segments to produce a single bend in a piece of timber, when so arranged and controlled as to commence simultaneously at both ends of the stick to bend it, and by the completion of the process, constitute the mold, having a continuous curvature.

27,569.—Frederick M. Ruschhaupt, of New York City, for an Improvement in Adaptation of Substances as Motive Powers:

I claim the application of vapor from the liquid set forth, as a motor or propelling agent in engines, as specified.

27,570.—James Sangster, of Buffalo, N. Y., for an Improved Churn:

I claim the combination of the paddles, Z and C and G, with the partition, E, when said partition is provided with openings, H J I K, near its center, and with openings, L M N O, near its periphery, which are partially covered by caps, as seen, for the purpose of passing the cream around and around through the openings, from circumference to center, vice versa, substantially as specified.

27,571.—Thos. Schofield, of Grass Valley, Cal., for an Improvement in Floating Bridges:

I claim the arrangement of the cylinders, A, or their equivalents, with arms, C, steadying rods, B, standards, D, and valves, c, substantially as and for the purpose specified.

[The object of this invention is to support bridges, lighthouses or other structures above water in places where the depth of the water does not allow of the application of pillars commonly used for such structures. The hollow globes or cylinders employed for this purpose are steadied by balance weights, and they are secured to the ground by suitable chains and anchors, and they are furnished with arms extending upwards for the purpose of supporting the structure to be erected. Any water that enters said cylinders or globes is removed by suitable valves and pumps.]

27,572.—G. H. Sealey and James Lee, of New York City, for an Improved Case for Exhibiting Stereoscopic Pictures:

We claim, first, The combination of the shaft, D, roller, F, and bands, E, or their equivalents, substantially in the manner and for the purpose specified.

Second, Having the ends of the aprons, or of the bands which carry the picture-holders, firmly secured to a rotary shaft, D, or its equivalent, substantially as specified, so that the whole chain of pictures is subjected to a uniform and positive strain, in whatever direction the shaft is turned.

Third, The arrangement of the spring clasps, d, in combination with the crossbars, c, substantially as and for the purpose set forth.

Fourth, Arranging the picture-holders, G, with wooden crossbars, c, substantially as described, so that the same allow of being attached to the bands or apron in a ready and cheap manner.

27,573.—William Sewell, of New York City, for an Improvement in Surface Condensers for Steam Engines:

I claim, first, The combination and use, in the manner shown and described, with the tubes and tube sheets, and follower or plate, D, of a series of independent elastic rings, for the purpose set forth.

Second, The simultaneous compression of the whole or a portion of said series of elastic rings by means of a plate, D, either whole or divided, substantially in the manner and for the purpose shown and described

Third, The employment of the flanged tubes in combination with the plate, D, and said rings, as and for the purpose shown and described.

27,574.—A. Sherman, of Poughkeepsie, N. Y., for an Improvement in Attaching Thills to Vehicles:

I claim the slotted semi-cylindrical enlargement, B, on the end of the thill irons, rubber packing, E, pin, J, jaws, G, the clips with their slots and the pins, a, projecting from the sides of the enlarged portions, B, when the same are all combined and arranged in the manner and for the purposes set forth.

27,575.—O. Sherwood, Jr., of Independence, Iowa, for an Improvement in Railroad Gates:

I claim the arrangement of the pulley, D, pinion, d, toothed sector, c, and lever, E, in combination with the hinged rails, G, bar, F, and gate, A, constructed and operating as and for the purpose substantially as described.

[This invention relates to that class of gates which are made to open and close by the action of the approaching and departing train, so that the track is thrown open only to let the train pass. The action of the wheels of the train on two hinged additional rails cause the gate to rise, keeping the same up until the last pair of wheels of the last car in the train have passed off from said hinged rails when the gate descends again by its own gravity.]

27,576.—Wm. N. Slason, of South Reading, Mass., for an Improvement in Pumps:

I claim connecting the rocker piston to the curved rim of its case, and so applying such rim to the remainder of the case as to enable both piston and rim to be moved both together or simultaneously relatively to the said remainder of the case, as specified.

27,577.—John Smalley, of Bound Brook, N. J., for an Improvement in Sewing Machines:

I claim, first, The combination of a hollow stationary "spool case" capable of containing different sized spools of cotton, with a rotating hook or looper, substantially as described, for the purpose set forth.

Second, I claim so arranging the spool case as that the needle shall always descend into the center of the spool placed in it, as described.

Third, I claim the formation of the spool case, S, in the manner specified, with a centralizing and steadying shaft, S', substantially as set forth.

Fourth, Disclaiming the passing of the needle thread around an ordinary spool carrying the lower thread, when said spool changes its position relatively to the other parts of the machine, I claim passing the needle thread around an ordinary spool containing the lower thread, remains always in a fixed position, substantially in the manner described.

Fifth, I claim the rotary hook and vertically fixed spool in combination with a needle carrying its thread into the center of the spool, substantially in the manner and for the purposes described.

27,578.—Wm. E. Stein, of New York City, for an Improved Dress-lifter:

I claim a dress-lifter composed of a waist band, A, fabric, B, guide tubes, a b, cord, c d, tapes, g, and weights, i, arranged and constructed as set forth and described.

27,579.—Wm. Stewart, of Philadelphia, Pa., for an Improvement in Grinding Mills:

I claim the arrangement of the runner, C, tubular shaft, F, conical hub, I, key, J, slot, h, spring, K, absorbent, j, and screw, M, as and for the purpose shown and described.

27,580.—D. B. Tiffany, of Xenia, Ohio, and S. W. Soule, of Milwaukie, Wis., for a Machine for Printing Addresses on Newspapers, &c.:

We claim the combination of the pressure lever, F, and the "chase," B, containing the "form;" the chase being operated from the lever, as shown, or in any other equivalent way, and the pinion, D', made to perform the double function specified, substantially as and for the purpose set forth.

Second, We claim raising or separating the particular line of type forming the address to be used from the remainder of the type in the chase, in the manner set forth, or an equivalent manner, for the purpose specified.

Third, We claim the sheet metal plate, J, or its equivalent, for returning the type to their proper positions, substantially as specified.

Fourth, We also claim a traversing partitional galley or chase, for holding and dividing the addresses, substantially as and for the purpose specified.

27,581.—Philip Umholtz, of Tremont, Pa., for an Improved Coal-breaker:

I claim the combination of the clutch, I, as constructed, with the rollers, B and B', constructed as set forth, operating as described and for the purposes set forth.

27,582.—T. R. Van Gelder, of Damascus, Pa., for an Improvement in Collecting Toll from Grist Mills:

I claim the arrangement and combination of the toll spout, B, vertical wheel, A, open bucket, b', and the spout, F, as and for the purpose shown and described.

[An engraving of this device will probably appear soon.]

27,583.—David Van Kleeck, of Cohocton, N. Y., for an Improvement in Harvesters:

I claim the arrangement of the reversible draft bar, L, connecting the tongue, G, with the frame, A, between the frames, A D, in such a manner that it may be reversed without turning the machine, substantially as set forth.

I also claim the adjustable reel, K, made to change from side to side by the cutter bar, without unbanding, by means of the shifting links, O, and pulleys, g h, substantially as described.

I also claim the reverse cutting or two-edged sickle, f, in combination with the center guard plate, b, and shifting apron, n, substantially in the manner and for the purposes set forth.

27,584.—George Walker, of Springville, N. Y., for an Improved Washing Machine:

I claim the combination of the radius bar, F, with the tub, A, rod, D, lever, E, and convex rubber, C, as shown, so that said rubber will have a combined rotary and longitudinal motion, as and for the purpose shown and described.

[The object of this invention is to subject the clothes to be washed to a squeezing as well as to a rubbing process; neither the squeezing without the rubbing, nor the rubbing without the squeezing, being sufficient to remove the dirt. The rubber in this machine, therefore, is arranged on an arm or arms connecting with a radius bar in such a manner that, by imparting to the rubber a rolling motion, it assumes at the same time a longitudinal sliding motion over the clothes, subjecting them to the rubbing process, while the weight of the rubber with its attachments, regulated, if necessary, by a downward or upward pressure of the hand, is sufficient to exert the necessary pressure on the clothes.]

27,585.—Sylvenus Walker, of Boston, Mass., for an Improved Bedstead:

I claim the end fastening, D, as constructed and arranged, for the purposes set forth.

27,586.—Reuben Warren, of Jefferson, Ohio, for an Improvement in Boot-crimping Machines:

I claim the flexible jaw bolt and thumbscrew, in combination with the brake pincers and tongues, as stated, for the purpose of crimping leather only.

27,587.—Alex'r T. Watson, of Castleton, N. Y., for an Improvement in Railroad Car Springs:

I claim, first, The manner of arranging and combining the two springs, B B', in pairs of different lengths and curves, so that when pressure is applied, the one spring gives out its elastic force from compression, and the other, as soon as acted on by the first spring, yields an elastic force from tension; the two together affording an increasing strength and elastic power as the pressure increases.

Second, I claim the form of the frame or setting, A A, by which the springs are held in position and made to act in the manner described.

27,588.—Geo. Westinghouse, of Schenectady, N. Y., for an Improvement in Crank Boxes:

I claim the slide, D, fitted within the dovetail slot, C, of the body, A, of the box, in connection with the screw bolt, E, passing through the body, A, and an oblong slot in the slide, substantially as and for the purpose set forth.

[This invention consists in a novel way of securing the slide in the box, whereby the slide may be readily adjusted and the box properly fitted to the crank wrist, and the crank, at the same time, firmly secured in position without the liability of being thrown out from the wrist during the rotation of the same.]

27,589.—John M. Whitney, of Bolton, Mass., for an Improved Odometer:

I claim so constructing an "odometer" that the revolutions of the wheel of the vehicle are registered equally reliably, in whichever direction the said wheel may be rotated.

I also claim the combination of a series of ratchet wheels on one center, with a series of operating slide bars driven by cams on the ratchet wheels, substantially as described for the purpose set forth.

I also claim the employment of a rubber, or other equivalent cushion, in combination with the yielding castor-holder, K, as specified, for the purpose set forth.

27,590.—Barnabas Wood, of Nashville, Tenn., for a Metallic Composition for Fusible Alloy and other purposes:

I claim the composition of matter or alloy, consisting of the following proportions of cadmium, lead and tin, or any modification thereof, substantially as indicated, so as to produce a similar result in alloys, to wit, cadmium from one to two parts, lead two parts, tin four parts, possessing the properties and advantages described, and that may be used as a metallic cement and for other purposes, and to which also mercury may be added, as set forth, to modify the result for particular cases.

I also claim, as a further application of the same principle embodied in the production of the aforesaid alloy, the composition of matter or alloy consisting of from one to two parts cadmium, two parts tin, four parts lead, and seven or eight parts bismuth, or any modification thereof, as specified and indicated, so as to produce an alloy, as described, useful as a cement and for other purposes, as set forth, and to which also mercury may be added, as stated.

What I claim as new, in either case, is the specified improvement in alloys produced by using cadmium in the ratio and manner described, in combination with the metals specified, in the proportions thereof, substantially as set forth.

27,591.—Dr. Theodore Burr, of Hastings, Mich., assignor to himself, J. B. Lobdell and A. Pelham, of Hastings aforesaid, and H. Burr, of Allen, N. Y., for an Improved Machine for Cutting Files:

I claim the use of the cylinder, F, constructed as described, in connection with spring hammers, cutters and file blank-carriers; the whole operating in the manner and for the purpose described.

27,592.—Geo. Cooper, of Hartford, Conn., assignor to Albert Burgess, of Windsor Locks, Conn., for an Improved Bench Clamp:

I claim the arranging together of the shank, b, arms, e, pad, f, with a proper fastening device as a screw, l, substantially in the manner and for the purpose described.

27,593.—Joseph J. Couch, of Brooklyn, N. Y., assignor to Josiah S. Swan, of New York City, for an Improvement in Sewing Machines:

I claim, first, Maintaining the needle thread of a sewing machine tight as the point of the needle penetrates the fabric, delivering out the necessary amount of thread for forming the loop and for the distention of the loop by the passage through it of the shuttle, maintaining the thread slack as the needle begins to rise, and finally drawing up the slack thread so as to complete the stitch by means of the lever, G, or its equivalent, in combination with the washers and clamp, or other device for imparting the desired friction to the said lever; the latter being operated by the needle arm or other moving part of the machine, substantially as and for the purposes set forth.

Second, The stationary eye, k, in combination with the lever, G, or its equivalent, when the latter is arranged, applied and operated substantially as set forth, and when the eye is made adjustable in respect to the lever, for the purpose specified.

Third, The combination of the lever, G, applied and operated substantially as set forth, with the shuttle of the sewing machine, so that the said lever may yield slightly on the distension of the loop by the shuttle when more than the usual amount of thread is required for the stitch, as set forth and for the purpose specified.

27,594.—L. W. Langdon (assignor to himself, Hiram Wells and D. G. Littlefield), of Northampton, Mass., for an Improvement in Sewing Machines:

I claim, first, Operating a four-motion feed by means of a loose and a friction joint, substantially in the manner and for the purpose specified.

Second, I claim the revolving take-up, L, operating as set forth, for the purpose of governing the needle thread, as described.

Third, I claim the hook, T, or other equivalent device, for the purpose of keeping the shuttle thread tight, as described, when used in combination with a needle driven by a crank, as set forth.

Fourth, And, in combination with a needle driven by a crank, I claim the rib, h', in the shuttle race, with its notch or shoulder, 3, for the purpose of preventing the loop from being carried forward by the shuttle, as set forth.

27,595.—E. A. Leland (assignor to himself and Stephenson & Tompkins), of Jacksonville, Ill., for an Improvement in Gas Stoves:

I claim the combination with the base, B, and cylinder, A, of the gas box, a b c, and supply pipe, E, as shown and described, so that the device may be used as a cooking or air-heating stove at pleasure, as set forth.

27,596.—Daniel Minthon (assignor to John A. Green), of Beverly, Mass., for an Improvement in Enema Syringes:

I claim the hollow valve constructed with a hemispherical end, and having apertures or throats formed in its sides for the fluid to pass through, substantially as set forth.

27,597.—Wm. H. Noyes (assignor to Gideon S. Palmer), of Gardiner, Maine, for an Improved Machine for Reducing Wood to Slivers:

I claim the combination, in a sliding stock, O, of the cutter, B, and splitter, C, made up of a series of knives in rows, so arranged that the posterior rows shall score the spaces left by the foremost row, substantially in the manner and for the purpose specified.

27,598.—Elizabeth Keagg, of Mineral Point, Pa., administratrix of the estate of Samuel Keagg; deceased, late of Mineral Point, aforesaid, for an Improved Centering Chuck for Lathes:

I claim the sliding thimble or sleeve, D, fitted on the mandrel, C, connected with a loaded lever, E, and provided with a flaring or funnel-shaped outer end concentric with the mandrel and its center points, a, to form a centering chuck for a lathe, as set forth.

[The object of this invention is to obtain a simple attachment that may be applied to any ordinary turning lathe, and serve as an efficient centering device therefor to admit of the very ready and proper adjustment of articles in the latter.]

27,599.—Hiram H. Scoville and D. R. Fraser (assignors to themselves and P. W. Gates), of Chicago, Ill., for an Improvement in Quartz-crushers:

We claim crushing quartz by the combined agency of a swinging concave trough, B, and a rising and falling roller, D, substantially as set forth.

27,600.—C. Edward Sneider (assignor to Wm. Poultney), of Baltimore, Md., for an Improvement in Breech-loading Fire-arms:

I claim, first, The combination with the locking spring, D, of the wedge, e, the spring, f, and the set screw, h; the whole applied and operating substantially as and for the purpose specified.

Second, The lever, F, applied in combination with the trigger guard and with the pin, j, substantially as and for the purpose specified.

[This invention relates to the locking spring that is used to secure the breech and barrel together in condition for firing in some kinds of fire-arms. It consists, first, in a certain contrivance applied to such locking spring for the purpose of constituting a means of adjustment to make the said spring lock the breech joint tightly and compensate for wear of the said spring and the projections on the breech and barrel upon which the said spring acts. It consists, secondly, in certain improved means of raising the locking spring from the projection on the breech to unlock it and permit it to be opened for loading.]

25,601.—John Stowell (assignor to himself and Daniel F. White), of Charlestown, Mass., for an Improved Feed-water Regulator for Steam Boilers:

I claim the combination with the float, B, and steam box, A, of the slotted rod, b, arm, I, valve, C, vessel, G, lever, H, or its equivalent, and a loaded lever, J; the whole applied and operating substantially as described.

[The object of this invention is to control the action of the feed pump, either by shifting a belt which drives it from a loose to a fast pulley, and vice versa, on one of the shafts by which it is driven, or by operating on any other means of starting and stopping the pumps; and it consists in a certain means employed, in combination with a float, whereby this result is produced very promptly and certainly at the instant of the water in the boiler falling or rising to certain levels.]

25,602.—Stephen Ustick, of Philadelphia, Pa., assignor to himself and Julius A. Pease, of New York City, for an Improvement in Clay Pipe Machines:

I claim, first, Constructing the die piece, J, with perforations or openings, t, to be filled with cotton, wool or other equivalent substance, in combination with the band or wrapper Y, substantially as and for the purpose described.

Second, The grooves or channels, u, in the die pieces, G and H, to be filled with cotton or other suitable fibrous substance, or an equivalent, in combination with the sheaths, v and w, for the purpose of lubricating the lips of the dies, as described and shown.

Third, The combination of the springs with the core, M, for the purpose of holding the latter in its place during the formation of the bell end of the pipe, substantially as described.

Fourth, Combining and arranging the ring, c, with the mold, L, and core, M, substantially as and for the purposes set forth.

Fifth, The combination and arrangement of the bevel pieces, b, with the adjustable sliding frame, i, as and for the purposes described.

Sixth, The cut-off ring, O', in combination with the shifting rod, O, or its equivalent, when arranged and operating in relation to the die, I, substantially in the manner and for the purposes set forth.

Seventh, The safety chamber, T, provided with the valve, U, arranged and operating in relation to the clay cylinder, B, substantially as and for the purpose set forth.

27,603.—C. J. Van Wyck (assignor to J. M. McCauley) of New York City, for an Improvement in Apparatuses for Distilling Oil from Coal:

I claim the construction of a retort, with a grate, c, in the bottom, and an inclined conductor, E, below such grate, as described, such conductor not being the outlet for the gaseous products of combustion of the fire by which the retort is heated.

[This invention consists in a certain construction of an apparatus for distilling coal or other substances with provision for the simultaneous extraction or solution and separation of oils or other products of two different qualities or specific gravities.]

27,604.—A. L. O. Wall, Geo. Roberts, and M. S. Carter, of Decatur, Ill., for an Improvement in Truck for Mole Plows:

We claim the combination or the crank axles, B B', link rods, G, traveling plate, F, and screwed spindle, C, substantially as described for the purposes set forth.

We also claim supporting the front axle in an adjustable bearing, when arranged and operating substantially as described for the purpose set forth.

27,605.—G. W. N. Yost (assignor to G. W. N. Yost & Co.), of Yellow Springs, Ohio, for an Improvement in Manufacture of Soap:

I claim the described new article of manufacture, namely, hard soap, prepared in a state of minute subdivision, instead of bars or cakes, substantially as set forth for the purposes described.

RE-ISSUES.

Louis Lefebore, of New Orleans, La., for an Improvement in Furnaces for Evaporating Sugar Juices. Patented Nov. 2, 1858; improvement added Jan. 24, 1860:

I claim, first, The hemispherical kettle, with alternate converging flutes, as and for the purpose described.

Second, In combination with the said kettle, fluting the surrounding brickwork, as described, so as to form an undulating flue around the kettle.

Third, Passing the connecting pipes of the kettles through the flues whereby they are utilized as evaporators, as set forth.

Fourth, The inclined gutter, in combination with the gutters of the respective kettles, as described.

Fifth, The cylindrical flue enclosing the latter, connected with the exit flue, and communicating with the undulating flue at the top by graduated draft channels, substantially as set forth.

Wm. Mallerd, of Bridgeport, Conn., for an Improvement in Gas Regulators. Patented Oct. 8, 1858:

I claim arranging the graduated lever, 4, with the adjustable weight 17, in combination with the gasometer, 2 2, and the valve 10, in such a manner that by raising the gasometer the valve is closed, and the supply of gas is stopped, so that the pressure of the gas in the gasometer can be regulated by adjusting the weight, 17.

And in combination with the lever, gasometer, and reservoir, I claim admitting the gas direct against the gasometer by means of a small tube, 8, which is contracted towards its upper end, so that impurities carried up by the gas or any other deposit will fall outside of said tube without being able to interfere with the working part of the gas regulator.

I also claim arranging the stud, 21, in combination with the lever, 4, rod, 9, and valve 10, in such a manner that by depressing the stud, 21, the supply of gas may be ascertained, without raising the cover of the gas regulator.

ADDITIONAL IMPROVEMENT.

Alban Anderson, of Lancaster, Pa., for an Improved Governor for Steam Engines. Patented August 3, 1858:

I claim the change from a disk revolving on an extended arm to a disk revolving over the center of the moving frame, and the consequent change in the mode of generating and applying the resultant force which arises from the combined movements of the disk and frame; which change in the mode of production and application of the power, brings the machine within a smaller compass, gives it more simplicity of construction, renders it safe to increase the velocity of its movements, and thus increase its sensitiveness and power, and especially it renders the attraction of gravitation inoperative, so that it does not act at all as a disturbing power.

DESIGNS.

S. W. Gibbs (assignor to Ratbone & Co.), of Albany, N. Y., for a Design for the Plates of a Cook Stove.

S. W. Gibbs (assignor to Ransom & Co.), of Albany, N. Y., for a Design for the Tops and Bases of Stoves.

Francis Hovey, of New York City, for a Design for a Copying Press.

Samuel H. Ransom, of Albany, N. Y., for a Design for Stove Plates.

# Notes & Queries

**A. H., of Ill.**—A solution of salt and alum is excellent for preserving the furs and skins of animals, but it will not keep them a sufficient length of time, as stuffed specimens of natural history. Such skins are treated with arsenical soap, which is a powerful antiseptic and preservative against the attacks of insects. We do not know where you can get Audubon's Natural History in monthly parts.

**R. W., of Mass.**—The whirling motion which water assumes in flowing from a hole in the bottom of a tub is not caused by electrical currents, as you suppose, for such currents do not move in spirals. This motion is caused by the resistance to the flow of water offered by the orifice, and it amounts to 27½ per cent of the power of the falling water. The co-efficient of discharge through an orifice is only 62¼ per cent, therefore the resistance by the orifice to the free falling of the water communicates motion to the mass in the tub, and this must affect the motion of the effluent water. Water will fall down in a straight line, in vacuum, where its passage is unobstructed.

**N. B. T., of Ohio.**—Iron and steel are rendered a deep blue color, by first polishing the metal, then heating it up to 570° Fah., and cooling it at this point. The color of any polished piece of steel indicates its temper. A straw color, which is the temper of lancets, is obtained by heating the polished metal to 430° Fah. 450° Fah. is the heat for razors, and is a dark yellow. A light purple is obtained at 530° Fah., which is the temper for watch springs and swords. 290° Fah. is the temper heat for large saws and 570° Fah. for small ones.

**E. C. Van D., of Miss.**—Your subscription will expire with No. 10 of our next volume (in September). You ask a recipe for a good solder, and we will give you one. Take 1 lb. of pure Banca tin, and melt it, then add half a pound of clean lead, and when it is melted, stir the mixture gently with a stick or poker, and pour it out into solder strips. We gave Mr. J. Lathrop, of Middleton, Conn., this solder receipt some years ago, and he has informed us that it has been worth $50 to him. He has never failed to make good solder with it.

**J. W. B., of Ala.**—Professsor Faraday has certainly declared that the efficiency of a lightning conductor is due to the solid section of the metal. We know it has been generally supposed that most of the electricity in conductors is carried on the surface; but not "wholly" on the surface. It has always been held by us that the electric fluid permeated the whole conductor.

**F. A. B., of Wis.**—You can make the plate or cylinder of an electric machine with wood, covered with several coats of lac-varnish as a substitute for glass. You may also mount your plate on a metallic axis, and have perfect insulation, if supported on pillars of dry wood. You must insulate your rubbers on glass, if possible. French glass is the best substance which you can use for the generating plate, and we must caution you not to expect much from the lac-covered plate as a substitute.

**R. D. O. S., of Conn.**—Small drills may be run at the rate of 3,600 revolutions per minutes, if kept cool with plenty of oil or water. A 54-inch circular saw may be driven at the speed of 4,500 feet per minute at the periphery. The proper speed for any saw depends upon the kind of wood that has to be cut. A good alloy for the lining of journal boxes is composed of copper, 24 ounces; tin, 24; antimony, 8. Melt all, and run into an ingot first; after which melt the ingot for the journal box, and pour it into the mold. In making alloys, melt the most fractions metals first, and the others according to their degree of fusibility.

**M. F. V., of Vt.**—The sketch which you have sent of an electro-magnetic engine represents one that is used as a toy somewhat extensively. It is of no practical value. If you desire to be a good engineer, we advise you to serve a full apprenticeship at the business, and commence first in a rather small country machine shop, where you will have an opportunity to try your skill upon all kinds of work. In large shops you would be too much confined to one specific kind of work, according to present custom.

**W. H., of Md.**—The recipe to which you refer for flavoring tobacco is to moisten it thoroughly with whiskey in which one pound of honey has been steeped to the gallon for two days, stirring it frequently during that period. This liquid imparts a pleasant flavor to the tobacco of cigars, and is used with success by some cigar manufacturers. Beeswax steeped in whiskey makes a good flavoring liquor for tobacco, also; and if the odor is desired to be hightened, add a little gum benzoin with the honey.

**C. A. S., of Maine.**—The conducting power of copper is 1.00; silver, .98; gold, 1.13; iron, 5.63; quicksilver, 50.00; zinc, 3.70. Silver is the best conductor of these metals; copper second, and mercury the worst—50 times. You will therefore perceive how unscientific it would be to employ cups containing mercury in any part of a line of telegraph. Pure rain-water is almost a non-conductor, in comparison with the metals. It is to copper as 40,653,723.00 to 1; salt water is about 14 times superior to fresh as a conductor.

**J. G., of Ind.**—It is true that there has been great difficulty in distinguishing among the lower organizations, plants from animals. Ehrenberg fell into the error, common to all the early microscopists, of believing many plants, in certain stages of their growth, to be animalcules, and with a strange want of the true philosophical spirit, he obstinately maintains his false position after all the other eminent miscroscopists of the world have given it up. Many of the continental microscopists, who are now some years behind the English in this department of science, still follow Ehrenberg; and we have now lying on our table a report of some French savans, which says that yeast consists of a plant and an animal. The part, however, of the yeast plant which, from its independent motion, is mistaken for an animal, is so exceedingly minute as to be barely visible under a microscope which represents the plant as large as a grain of wheat. These minute organisms, even if they were animals, would not produce a 1,000th part of the carbonic acid that is given off in fermentation. The first time that we saw them, though we had long been aware of the dispute in regard to their nature, it was almost impossible to believe that they were not animals, so life-like were their motions. But Hassall, Carpenter and Edwards have, we think, pretty fully settled the question; and there is hardly room to doubt that they are simply the plant in one stage of its growth.

## Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, March 24, 1860:—

P. M., of Mass., $30; W. T., of N. Y., $30; J. A. McC., of Ky., $25; W. McA., of Mich., $30; A. B., of N. J., $30; W. J. A., of Tenn., $30; H. E. W., of N. Y., $30; J. M. F., of N. C., $55; H. K., of Ill., $30; N. H. G., of Conn., $30; H. A. H., of N. J., $25; C. F. B., of R. I., $90; H. W. W., of Mass., $25; R. J. G., of Ind., $30; N. S. G., of N. Y., $25; D. C. J., of N. Y., $30; B. I., of N. Y., $30; J. D. M., of N. Y., $30; J. H. D. & Co., of Texas, $30; C. & B., of Iowa, $25; P. G. McC., of Pa., $30; J. S., of N. Y., $25; J. S., of Ill., $30; W. S. M., of N. Y., $30; J. C., of Mass., $30; M. M., of Mo., $10; J. E. E., of Pa., $50; J. P. K., of Wis., $25; B. W. B., of Wis., $25; C. P. G., of Ill., $30 W. T., of Ind., $25; T. H. W., of Mass., $30; E. F. R., of N. Y., $30; R. F. O'B., of Mo., $25; T. P., of Ind., $55; W. J. T., of Cal., $20; E., & D., of Mass., $10; G. W. B., of Mass., $25; A. H., of Ky., $25; W. C., of Iowa, $30; C. W. B., of Mass., $55; R. P. A., of N. Y., $30; D. & S., of N. Y., $25; J. P. F., of N. Y., $30; F. B. B., of N. Y., $250; M. C., of N. Y., $30; A. H. R., of Pa., $30; C. W., of Mass., $25; I. N. W., of Ill., $25; C. S. I. of Ind., $25; A. K., of Ill., $15; G. W. W., of Ind., $30; H. A. M., of Ill., $30; P. & H., of Canada, $465; J. P. H., of La., $20; A. W. W., of Conn., $30; W. F., of Mass., $60; P. J., of N. Y., $25; J. S. H., of Ky., $25; J. M. C., of S. C., $30; J. B., of Mass., $25; G. & B., of Conn., $12; P. V. W., of Mich., $30; B. & B., of Mass., $55; H. C., of N. Y., $25; J. H. L., of N., $25; G. W. T., of N. Y., $25; J. R. T., of L. I., $25; D. E., of Ill., $55; A. H., of Ohio, $30; W. B., of N. Y., $275; J. B. J., of L. I., $30; S. T. McC., of Ga. $25; L. B., of Ill., $30; W. H., of Ohio, $25; J. M., Jr., of N. Y., $70; T. J. M., of Pa., $15; C. R. S., of Vt., $25.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, March 24, 1860:—

A. S., of N. Y.; C. W., of Mass.; W. W. H., of N. Y.; H. K. of Ill.; W. I. T., of Texas; N. S. G., of N. Y.; G. & B., of Conn.; C. R. S., of Vt.; J. R. T., of L. I.; G. W. T., of N. Y.; J. S., of N. Y.; R. F. O'B., of Mo.; S. McQ., of Ill.; I. N. W., of Ill.; T. J. M., of Ind.; G. W. T., of N. Y.; W. H., of Ohio; D. E., of Ill.; A. H., of Ky.; D. & S., of N. Y.; J. B., of Mass.; H. A. H., of N. J.; H. W. W., of Mass.; B. W. B., of Wis.; J. B. J., of N. Y.; L. K. S., of Conn. (2 cases); H. C., of N. Y.; S. T. S., of Mass.; J. H. L., of N. Y.; G. W. B., of Mass.; W. T., of Mich.

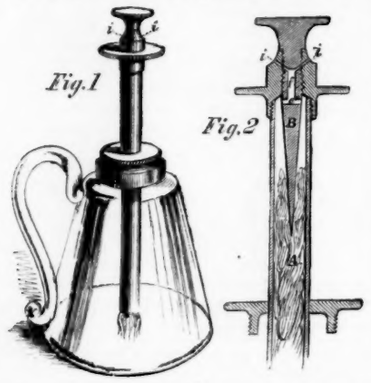
## Literary Notice.

MUSPRATT'S CHEMISTRY OF ARTS AND MANUFACTURES. Published by C. B. Russell & Bro., Boston, and No. 290 Broadway, this city.

This, the most full and complete chemical work yet published, has now reached part XLV., which contains a beautiful steel plate of Professor Gregory, the author of one of the best elementary works on chemistry ever published in our country.

## GREENE'S GAS LAMP.

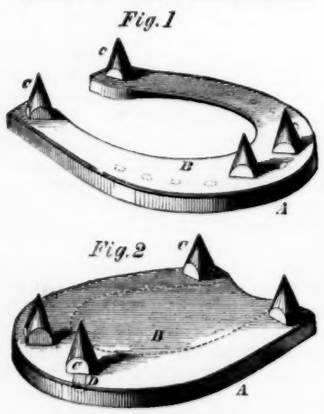
The inventor of this lamp is a physician who discovered that he could make more money by selling patent rights than he could by practicing medicine, and as, according to the testimony of Louis, Jackson, and all the most learned masters of therapeutics, there is scarcely anything positively known in regard to the treatment of disease, the doctor considered the negotiation of these sales as more useful and honorable, as well as more lucrative, than the dealing out of doubtful doses. He accordingly obtained an agency for the sale of patent rights of Clayton & Bailey's gas lamps; but improvements soon occurred to him, and he invented the lamp here illustrated. He is now located in Boston, doing a dashing business, having, as he says, sold over $20,000 worth of his lamps during the last three years, and is making a vigorous effort to introduce them all over the world.




The lamp is designed for burning the common mixture of alcohol and camphene, called burning fluid. It is very simple, and will be readily understood by inspecting the cut, in which Fig. 1 is a perspective view of the whole lamp, and Fig. 2 an enlarged view of the wick tube. The wick, A, extends downward into the fluid, and upward nearly to the top of the tube, where it is pierced by the solid metallic spur, B. Directly through this spur, is the hole, *e*, which communicates with the vertical hollow, *f*, and this with the inclined openings, *i i*, which are extended also through the tube, forming jets for the escape of the vapor or gas which is burned as it issues. The lamps are made of various illuminating powers by simply varying the number of these orifices. The heat of the spur evaporates the fluid which is conducted to it by the wick, and thus a constant flow of vapor is caused to issue from the jets.

The patent for this invention was taken out by Dr. C. A. Greene, April 21, 1857, and further information in relation to it may be obtained by addressing Dr. C. A. Greene & Co., 34 Washington-street, Boston, Mass.

## JOREY'S PATENT HORSE SHOE.




The annexed engravings illustrate an invention in which two important objects are aimed at, and, for ought we see, practically attained; one is the obviating of the very serious difficulty from the balling of the feet in snowy roads, and the other is a great facility in sharpening the corks in icy times, when the horse shoer is most hurried.

A horse shoe, B, Fig. 1, is made in the ordinary form, with female screws in the place of the corks; and the cast steel corks, C C, are made with screws upon their shanks, so that they may be inserted into the shoe and renewed without removing the shoe from the foot.

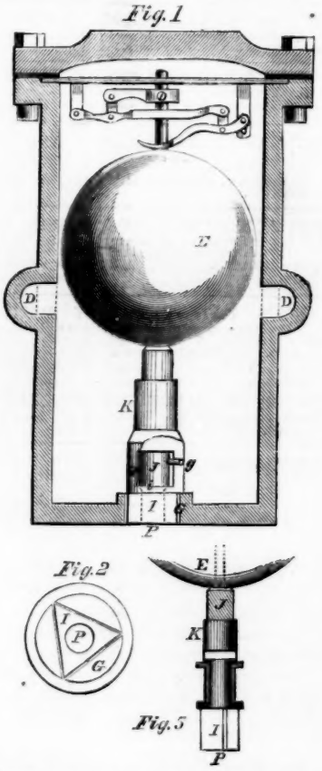
Whenever occasion requires the shoe may be covered with the cast steel plate, B, Fig. 2, which is fastened to the shoe by the screw shanks of the corks passing through it, as shown at D. This plate, besides affording an absolute protection against balling, also furnishes a convenient means of keeping the hoof of the horse moist in case of a tendency to fever or dryness, as a sponge may be introduced between the plate and the hoof, which will be soaked whenever the animal steps into water, and thus kept constantly moist, saving the hostler the unpleasant task of "stuffing."

The movable corks may be changed at pleasure to suit the condition of the roads, and those corks worn down in the winter may be kept for use in the summer Being made of cast steel, there is no practical difficulty from the screws rusting, as has been shown by experience. The inventor exhibited at our office shoes which had been in use for a long time, and the corks were easily unscrewed with an ordinary wrench.

The patent for this valuable invention was issued July 5, 1859, and further information in regard to it may be obtained by addressing the inventor, Joseph Jorey, care of John Kendall, at Norwich, Conn.

## LAPHAM'S STEAM TRAP.

The annexed cut represents a self-acting steam trap, by which, as the water accumulates in pipes from the condensation of the steam, it is removed automatically.







The ball, E, is a hollow float inclosed in a tight metallic cylinder, into which the steam is admitted through the annular opening, D; the cylinder being placed at the lowest portion of the series of pipes which it is intended to keep free from water. As the water accumulates in the cylinder it raises the float, E, which fits loosely around the upper part of the rod, J, the rod passing through a water tight pipe which is soldered into the float. With the top of the rod, J, is connected a series of levers in such manner that, as the float rises, it raises the rod through a less a distance and with increased power. The lower portion of the rod passes loosely through the sleeve, K, which is a valve closing an opening in the bottom of the cylinder. There is, however, in addition, a supplementary valve formed of the foot of rod, J, which closes a smaller opening, P, Fig. 2, through the sleeve, K, which is made in triangular form, as shown at I, Fig. 2. A slight rise of the float, E, lifts the rod, I, from its seat and allows the water to flow slowly through the opening, P, but should the supply from condensation be more rapid than this discharge, then the float continues to rise and the pin, *g*, is brought in contact with the upper edge of the slot in the sleeve, K, carrying the sleeve, K, upward and opening the larger valve. Thus the discharge is adjusted to the quantity of water condensed in the pipes.

The patent for this invention was issued to Allen Lapham, of Brooklyn, N. Y,, on January 24, 1860, and persons desiring further information in relation to it will please address C. A. Durgin, agent, No. 335 Broadway, N. Y.

## HOWE'S SEWING MACHINE TRIAL.

Just as we were putting our last number to press, we received notice of an important sewing machine trial, just terminated in Boston. Our informant stated that the case was against Messrs. Ladd, Webster & Co., the well-known sewing machine manufacturers; we have since learned that the information was not correct. It was a trial in equity, before Judge Sprague, of the United States District Court, in which Howe applied for a preliminary injunction against Williams, who had made and sold a machine like Grover & Baker's; also against Morton, and others, who sold a machine resembling Wheeler & Wilson's. We understand that (with a view to prevent this injunction) the evidence was fully gone into, especially into the alleged prior English and French inventions of Fisher & Gibbons, Newton, Archibald, Thimmonier, and others. After a full hearing of the case, the court ordered an injunction.

## APPLICATIONS FOR THE EXTENSION OF PATENTS.

*Cooking Range.*—H. H. Stimpson, of Boston, Mass., has applied for the extension of a patent granted to him on the 16th of May, 1846, for an improvement in cooking ranges. The petition is to be heard at the Patent Office on the 14th of May next; and the testimony closes on the 1st of that month.

*Machine for Welding Wrought Iron.*—Daniel Treadwell, of Cambridge, Mass., has applied for the extension of a patent granted to him on the 20th of June, 1846, for an improvement in machines for welding wrought iron. The petition is to be heard at the Patent Office on the 18th of June next; and the testimony closes on the 1st of that month.